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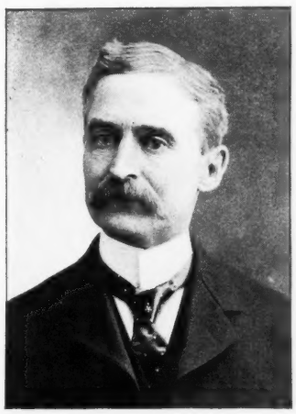
ASPHALT PAVEMENTS.

BY GEO. W. TILLSON, M. AM. SOC. C. E.



GEORGE W. TILLSON, C. E., Brooklyn, N. Y.

THERE is probably no one feature in the development of the modern city that has added more to its general appearance as well as to its utility as the introduction of asphalt pavements. When the success of asphalt as a paving material was demonstrated by its use on Pennsylvania avenue, in Washington, in 1876, a new era in street pavements was begun. Previous to that time all smooth pavements had been laid with wood or coal tar concrete. Many experiments had been made with different kinds of wood laid in many different ways; but the material itself was so susceptible to the action of the weather, that, while very satisfactory when first laid, the pavements soon began to decay, be unsanitary, rough and uneven. The coal tar pavements also proved very unsatisfactory. As soon as asphalt pavements had passed their experimental stage the different municipal officers were very quick to see its advantages and adopt it for use.

It was first laid in Newark, N. J., in 1870, but was not used to any great extent previous to 1880, but in 1890, according to the census reports, there were 6,803,054 square yards in the United States, and 1,698,846 square yards in all Europe. Exact figures for 1901 cannot be given at the present time, but the amount cannot be far from 35,000,000 square yards. According to a bulletin issued by the United States Department of Labor in 1900, there were 30,203,946 square yards in 129 cities having more than 30,000 inhabitants. These figures speak more eloquently than any words can of the popularity of this kind of a pavement.

It will be in order now to consider somewhat the properties of an asphalt pavement to ascertain if this popularity be deserved; if it be likely to prove a fad which in a few years will die out and the pavement come into disrepute.

An asphalt pavement is durable, smooth, sanitary, can be easily cleaned, and presents little resistance to traffic, all of which properties are of great importance in any pavement. The sanitary properties of a pavement are now receiving much attention, especially in our large cities, and in this respect asphalt must take first rank, as it is impervious to moisture and does not contain or produce any disease germs. The noise of traffic in a crowded city, where the nerves of the people are strained to their utmost tension, increases the tendency to mental disorders and retards the cure of all diseases. That asphalt pavement is a preventive of this is shown from the fact that it is largely laid around schools, churches and hospitals.

It is a well established fact at the present time that city streets must be kept clean, and when they are paved with asphalt this can be accomplished at a minimum cost.

It is said by the opponents of this pavement that it is slippery and expensive to maintain. Asphalt *per se* is not slippery, but any smooth surface is made slippery more quickly than a rough one when any slippery substance is deposited upon it. If asphalt could be kept perfectly clean or dry horses would very seldom slip upon it. The worst conditions it has to meet are damp, misty weather or a slight covering of snow at low temperature. There is much less trouble on the former account in the interior cities than in those on the coast, as such weather is much more infrequent. The remedy in such cases is to provide the section street cleaners with a small amount of sand to be scattered over the pavement whenever it is so slippery as to interfere with traffic. This can be done with very little trouble, and the result

FIG. I.—VIEW OF STREET BEFORE ITS IMPROVEMENT.

obtained, an almost ideal pavement the entire year, will certainly justify the extra labor involved.

Very little exact data can be obtained as to the exact cost of repairing asphalt pavements in the different cities, because sufficient time has not elapsed since the guarantees have expired to furnish reliable information, and on account of the different methods employed of making repairs and the loose ways of keeping accounts. In the city of Buffalo, where exact records have been kept on a large amount of work, the costs for repairs have been: In 1895, $0.067 per square yard; in 1896, $0.0439; in 1897, $0.048; in 1898, $0.0288; and in 1899, $0.0308, the area kept in repair ranging from 1,019,905 square yards in 1895, to 2,629,651 in 1899. This certainly does not seem excessive. Besides the figures previously given it will be interesting to know that out of twenty-four separate proceedings for original street improvements in the Borough of Brooklyn, seventeen were for asphalt pavements.

Real estate men appreciate the value of this pavement, and in the last three years some eight or ten streets have been paved with asphalt in Brooklyn under private contracts at the owners' expense. Figure 1 shows one of these streets before any work had been done, and Figure 2 gives a good idea of the street some eighteen months after the pavement was laid. Can anyone doubt that the work was a good investment? Figure 3 shows an asphalt pavement on Wall street, New York, near Broad street, which has been in use some four or five years. Figure 4 shows Union Square West, the view being from Fourteenth street looking north. Figure 5 shows a view of Fifth avenue, looking up town from the junction of Broadway. These views are given in order to illustrate graphically the faith the New York City officials must have in asphalt as a paving material when they lay it on such thoroughfares as these. It can be said also in this connection that during the past year Broadway has been paved with asphalt from Fourteenth to Forty-second street.

After having briefly reviewed asphalt pavements, their value, as well as their locations and properties, it will be well to inquire somewhat into the character of asphalt itself, and how these pavements are obtained from it.

FIG. 2.—VIEW OF STREET EIGHTEEN MONTHS AFTER.

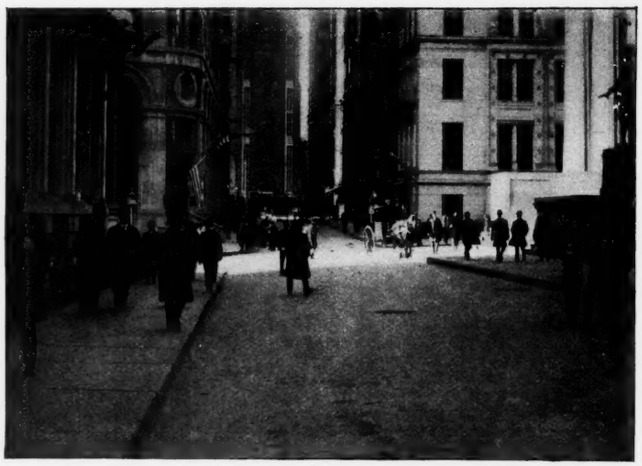


FIG. 3.—ASPHALT PAVEMENT ON WALL ST., NEW YORK.

Asphalt is a hard natural bitumen. It is very seldom found in a pure state, but mixed with silicious, argillaceous and some organic matter. It is scattered pretty generally over the earth's surface; the principal deposits from which material is obtained for pavements in the United States are: Trinidad, Venezuela and California. Some asphalt has been used successfully from Kentucky, Utah, Indian Territory and Mexico, but these mines have not yet been fully developed.

The valuable part of the asphalt is the contained bitumen, and this is the portion soluble in carbon-bisulphide, chloroform or other similar solvents. The quantity of bitumen is important from a commercial but not from a paving standpoint. Asphalt is sold by the ton, and the more bitumen the more yards of pavement per ton. Bitumen is a complex hydrocarbon, and while not a positive substance, is generally considered to be made up of petrolene and asphaltene, the former being the portion soluble in petroleum ether and the latter the remainder which is soluble in carbon-bisulphide. Petrolene is a thick, sticky, viscous liquid, flowing at ordinary temperatures, while asphaltene is hard and dry, with much the appearance of coarse black gunpowder. Petrolene may become asphaltene, but the latter never petrolene. All asphalts will not make good pavements on account of the different character of the contained bitumen. None of the asphalts on the market to-day are suitable for pavements when refined. They must be fluxed with some material containing a large amount of petrolene, such as petroleum residuum or maltha. The petrolene of the flux acts as a solvent upon the asphaltene and produces what is called paving cement of the desired consistency. The amount of the flux depends upon its character as well as that of the asphalt itself. With Trinidad asphalt about eighteen pounds of residuum is generally used to one hundred pounds of refined asphalt.

The asphalt as it comes from the mines is refined by boiling to drive off the water and volatile oils, and at the same time some of the foreign matter is removed. It can be brought to different degrees of purity, but when used for pavements Trinidad asphalt generally contains 55 per cent.; California, 80 per cent.; and Bermudez, 90 per cent. of bitumen, and their values for paving purposes per ton are inversely as these quantities.

SUPPLEMENT TO THE MUNICIPAL JOURNAL AND ENGINEER, NEW YORK, FEBRUARY, 1901

Cost of Asphalt Pavements, including Base, Binder, We

Compiled by F. V. E. BARDOL, Buffalo, N. Y., Jan., 1901

CITY.	Average Price for 1900, Including Concrete, Binder and Wearing Surface.	Thickness of Concrete.	Proportions of Concrete.	Cost of Concrete Per Cubic Yard.	Correction for Concrete, Buffalo Specifications.	Kind of Cement.	Cost of Cement Per Bbl.	Cost of Sand Per Cu. Yd.	Cost of Broken Stone Per Cu. Yd.	Depth of Binder.	Correction for Binder, Buffalo Specifications.	Thickness of Wearing Surface.	Correction for Wearing Surface, Buffalo Specifications.	Period of Guarantee.	Correction for Guarantee, Buffalo Specifications.	Names of Companies Bidding.	Hours of Labor.	Prevailing Rate of Wages, Common Labor.	Correction for Labor, Buffalo Rates.	"A." Price Per Sq. Yard Reduced to Buffalo Specifications. (See Foot Note).
ALTOONA	2.47	6″	1-2-5	4.20	—.14	Natural	.80	1.55	1.68	1″	+.10	1½″	+.19	5 Yrs.	+.15	Barber Asphalt Pav. Co. Alcatraz Paving Co.	10	1.60	+.04	2.81
ATLANTA	2.83	6″	1-2-4	4.50	—.10	Natural	1.00	.75	1.25	1½″	0.00	1½″	+.19	10 “	0.00	The Southern Pav. & Contr. Co. The Warren Scharf Asph. Pav. Co.	10	1.00	+.10	3.02
BALTIMORE	2.18	6″	1-3-5	3.30	0.00	Natural	1.00	.75	1.50	1½″	0.00	2″	0.00	5 “	+.15	The Filbert Pav. & Const. Co.	8	1.66	0.00	2.33
BINGHAMTON, N. Y.	NO ASPHALT.																			
BINGHAMTON, N. Y.	NO ASPHALT.																			
BOSTON, MASS.	3.25	6″	1-3-7	4.50	—.24	Portland	2.50	1.30	1.70	1½″	0.00	1½″	+.19	10 “	0.00	The Barber Asph. Pav. Co. The United States Pav. Co.	9	1.75	0.00	3.20
BROOKLYN	3.15	5″	1-3-6	5.63	—.17	Portland	2.20	.75 to .80	1.60	1″	+.10	2″	0.00	10 “	0.00	The Crawford Pav. Co. Brooklyn Alcatraz Pav. Co. Eastern Bermudez Pav. Co.	8	1.50	0.00	3.08
BUFFALO, N. Y.	**2.20**	**6″**	**1-2-5**	**3.30**		**Natural**	**.70**	**1.25**	**1.10**	**1½″**		**2″**		**10 “**			**8**	**1.50**		**2.20**
CAMBRIDGE	NO ASPHALT LAID IN 1900.																			
CANTON	NO ASPHALT LAID IN 1900.																			
CHATTANOOGA	2.68	6″	1-2-5		0.00	Natural						2½″	—.19	5 “	+.15	The Warren-Scharf Asph. Pav. Co.				2.64
CINCINNATI	2.05	6″	1-2-6	2.60	—.03	Natural	.60	.75	1.35	Cushion ½ in.	+.10	2″	0.00	5 “	+.15	The Warren-Scharf Asph. Pav. Co. The Barber Asphalt Pav. Co. Trinidad Asph. Pav. Co.	10	1.50	+.05	2.32
CLEVELAND, O.	2.17	6″	1-2-4		0.00	Natural				1″	+.10	2″	0.00	10 “	0.00	The Warren Scharf Pav. Co. The Cleveland Trin. Asph. Pav. Co. The Alcatraz Asph. Pav. Co.				2.2
COLUMBUS	2.20	6″	1-2-4	3.00	—.11	Natural	.80	1.00	1.10	1″	+.10	2″	0.00	10 “	0.00	The Warren Scharf Asph. Pav. Co. The Barber Asph. Pav. Co. A. G. Pugh	10	1.50	+.05	2.24
DENVER	2.13	6″	1-2-4	4.50	—.20	Natural	1.25	.50	2.00	1	+.09	2″	0.00	5 “	+.15	Colorado Paving Co. Bermudez Asph. Pav. Co. Denver Paving Co.	8	1.60	0.00	2.17
DES MOINES	1.96	4½″	1-2-4		+.10	Natural		.40	1.25	1″	+.10	1½″	+.19	7 “	+.09	Bermudez Asph. Pav. Co. Barber Asph. Pav. Co.	10	1.75	+.02	2.45
*DETROIT			1-2-4		—.07	Natural				1″	+.10	2″	0.00	10 “	0.00	American Const. Co. Alcatraz Paving Co.			0.00	
*ERIE	2.30	6″	1-2-5		0.00	Natural				1½″	0.00	1½″	+.19	10 “	0.00	Alcatraz Paving Co. Trinidad Asph. Pav. Co. Barber Asph. Pav. Co.			0.00	2.49
FORT WAYNE	2.40	6″	1-2-5		0.00	Natural		.65	1.15	1½″	0.00	2″	0.00	10 “	0.00	Bermudez Asph. Pav. Co. Barber Asphalt Pav. Co.	10	1.50	+.05	2.45
GALVESTON	NO ASPHALT.																			
*GRAND RAPIDS	1.75 1.43	6″	1-2-5		+.10	Natural	.70	.40	1.00	1″	+.10	2″	0.00	10 “	0.00	Warren Scharf Asph. Pav. Co. Northern Pav. & Const. Co.	10	1.50	+.05	
KANSAS CITY	2.12	5″	1-2-5		+.03	Natural		.80	1.00	1½″	0.00	1½″	+.19	10 “	0.00	The Barber Asph. Pav. Co. Parker Washington Pav. Co. Gilsonite Roofing & Pav. Co.	8	1.40	+.03	2.31
LAFAYETTE, IND.	2.00	6″	1-2-6	4.00	—.11					1″	+.10	1½″	+.19	10 “	0.00	Western Paving & Supply Co. Warren-Scharf Asph. Pav. Co. Barber Asph. Pav. Co.	10	1.50	+.05	2.25
LOS ANGELES	1.80	6″	1-3-6	6.00	—.21	Portland	2.50	.40	1.00	No	+.28	2″	0.00	No	+.18	Alcatraz Paving Co.	10	2.00	—.01	2.04
MILWAUKEE	1.85	6″	1-2-5		+.04	Natural	.55	.65	1.10	1″	+.10	2″	0.00	5 “	+.15	Warren Scharf Asph. Pav. Co. Western Pav. & Supply Co. Barber Asph. Pav. Co.	10	1.50	+.05	2.15
*MINNEAPOLIS		6″	1-2-5	3.00		Natural	.80	.55	1.35	1″	+.10	2″	0.00		?		8	1.75	—.04	
MONTREAL	3.25	6″	1-3-4	6.00	—.45	Portland	2.84	.75	1.25	½″	+.19	2½″	—.19	10 “	0.00	Northern Paving & Const. Co.	10	1.25	+.07	2.87
*NEWARK	2.03	6″	1-3-7 1-3-5			Portland Natural				1½″	0.00	2″	0.00	10 “	0.00	Barber Asph. Pav. Co. Metropolitan Pav. Co.				
NEW ORLEANS	2.50	6″	1-3-7	8.00	—.40	Portland		2.02	2.02	1½″	0.00	2″	0.00	5 “	+.15	Louisiana Improvement Co. General Asph. Co. of France. Southern Asph. Pav. Co.	10½	1.50	+.05	2.36
NEWPORT NEWS	2.63	6″	1-2-5	4.80	—.25	Natural	.95	.50	2.20	1½″	0.00	1½″	+.19	10 “	0.00	Cleveland Trinidad Pav. Co.	10	1.25	+.08	2.68
NEW YORK	2.556	6″	1-3-6	5.83/	—.15	Portland	2.50	.45		1″	+.10	2″	0.00	10 “	0.00	Barber Asph. Pav. Co. Atlantic Pav. Co. Alcatraz Asph. Pav. Co.	8	2.00	—.07	2.58
NORTH ADAMS	NO ASPHALT.																			
*OAKLAND, CAL.		6″	1-3-5	5.50		Portland	2.50 3.25	@1.00	@1.00	No	+.28									
OGDEN CITY	NO ASPHALT LAID IN 1900.																			
OMAHA	2.11	6″	1-2-5	5.00	—.03	Natural	.85 to .75	.65 to .75	1.35 1.45	1½″	+.00	1½″-2″	+.10	5 “	+.15	Barber Asph. Pav. Co. Alcatraz Asph. Pav. Co. The Grant Paving Co.	10	1.65 1.85	+.02	2.37
PEORIA, ILL.	1.96	6″	1-1½-4	4.50	0.00	Natural	.55	1.00	1.50	1″	+.10	1½″	+.19	5 “	+.15	Warren-Scharf Pav. Co. Barber Asph. Pav. Co. Bermudez Asph. Pav. Co.	10	1.50 1.75	+.02	2.42
*PHILADELPHIA	2.25 2.50	6″	1-3-6			Portland Natural				1″	0.00	2″	0.00	5-10 “	+.07	Vulcanite, Penna. & Alcatraz Pav. Cos. Richardson & Ross				
PITTSBURG	2.44	6″	1-2-4		—.15	Natural	@.70	.65	1.70	1″	+.10	2″	0.00	5 “	+.15	Pittsburg Asph. Pav. Co. Penna. Asphalt Pav. Co.	9-10	1.50 1.60	+.04	2.51
PROVIDENCE, R. I.	2.65	6″	1-2-6	5.10	—.29	Portland	2.20	.50 to .75	2.00	1½″	0.00	1½″	+.19	5 “	+.15	Narragansett Imp. Co.	10	1.50 1.75	+.05	2.71

bhalt Pavements, including Base, Binder, Wearing Surface

Compiled by F. V. E. BARDOL, Buffalo, N. Y., Jan., 1901

Cost of Concrete Per Cubic Yard.	Correction for Concrete, Buffalo Specifications.	Kind of Cement.	Cost of Cement Per Bbl.	Cost of Sand Per Cu. Yd.	Cost of Broken Stone Per Cu. Yd.	Depth of Binder.	Correction for Binder, Buffalo Specifications.	Thickness of Wearing Surface.	Correction for Wearing Surface, Buffalo Specifications.	Period of Guarantee.	Correction for Guarantee, Buffalo Specifications.	Names of Companies Bidding.	Hours of Labor.	Prevailing Rate of Wages, Common Labor.	Correction for Labor, Buffalo Rates.	"A." Price Per Sq. Yard Reduced to Buffalo Specifications (See Foot Note).	City Engineer.	Remarks.
4.20	—.14	Natural	.80	1.55	1.68	1″	+.10	1½″	+.19	5 Yrs.	+.15	Barber Asphalt Pav. Co. Alcatraz Paving Co.	10	1.60	+.04	2.81	Harvey Linton.	
4.50	—.10	Natural	1.00	.75	1.25	1½″	0.00	1½″	+.19	10 "	0.00	The Southern Pav. & Contr. Co. The Warren Scharf Asph. Pav. Co.	10	1.00	+.10	3.02	R. M. Clayton.	
3.30	0.00	Natural	1.00	.75	1.50	1½″	0.00	2″	0.00	5 "	+.15	The Filbert Pav. & Const. Co.	8	1.66	0.00	2.33	B. T. Fendall.	
					NO ASPHALT.												J. Kendrick.	
					NO ASPHALT.												S. D. Kane, *City Clk.*	None laid since 1898.
4.50	—.24	Portland	2.50	1.30	1.70	1½″	0.00	1½″	+.19	10 "	0.00	The Barber Asph. Pav. Co. The United States Pav. Co.	9	1.75	0.00	3.20	B. T. Wheeler.	
5.63	—.17	Portland	2.20	.75 to .80	1.60	1″	+.10	2″	0.00	10 "	0.00	The Crawford Pav. Co. Brooklyn Alcatraz Pav. Co. Eastern Bermudez Pav. Co.	8	1.50	0.00	3.08	George W. Tilson.	
3.30		**Natural**	**.70**	**1.25**	**1.10**	**1½″**		**2″**		**10 "**			**8**	**1.50**		**2.20**	F. V. E. Bardol.	
					NO ASPHALT LAID IN 1900.												L. M. Hastings.	None laid since 1895.
					NO ASPHALT LAID IN 1900.												P. H. Weber.	Price, including grading, $2.83. None laid since 1892.
	0.00	Natural						2½″	—.19	5 "	+.15	The Warren-Scharf Asph. Pav. Co.				2.64	Robt. Hooke.	
2.60	—.03	Natural	.60	.75	1.35	Cushion ½ in.	+.10	2″	0.00	5 "	+.15	The Warren-Scharf Asph. Pav. Co. The Barber Asphalt Pav. Co. Trinidad Asph. Pav. Co.	10	1.50	+.05	2.32	N. J. Stanley.	
	0.00	Natural				1″	+.10	2″	0.00	10 "	0.00	The Warren Scharf Pav. Co. The Cleveland Trin. Asph. Pav. Co. The Alcatraz Asph. Pav. Co.				2.27	James Ritchie.	
3.00	—.11	Natural	.80	1.00	1.10	1″	+.10	2″	0.00	10 "	0.00	The Warren Scharf Asph. Pav. Co. The Barber Asph. Pav. Co. A. G. Pugh.	10	1.50	+.05	2.24	J. Griggs.	
4.50	—.20	Natural	1.25	.50	2.00	1	+.09	2″	0.00	5 "	+.15	Colorado Paving Co. Bermudez Asph. Pav. Co. Denver Paving Co.	8	1.60	0.00	2.17	W. P. Jones.	
	+.10	Natural		.40	1.25	1″	+.10	1½″	+.19	7 "	+.09	Bermudez Asph. Pav. Co. Barber Asph. Pav. Co.	10	1.75	+.02	2.45	G. E. Eberhart.	
	—.07	Natural				1″	+.10	2″	0.00	10 "	0.00	American Const. Co. Alcatraz Paving Co.			0.00		R. H. McCormick.	Price, including grading, curbing, etc., $2.91. $2.50.
	0.00	Natural				1½″	0.00	1½″	+.19	10 "	0.00	Alcatraz Paving Co. Trinidad Asph. Pav. Co. Barber Asph. Pav. Co.			0.00	2.49	B. F. Briggs.	
	0.00	Natural		.65	1.15	1½″	0.00	2″	0.00	10 "	0.00	Bermudez Asph. Pav. Co. Barber Asphalt Pav. Co.	10	1.50	+.05	2.45	F. M. Randall.	
					NO ASPHALT.												C. A. Cias.	
	+.10	Natural	.70	.40	1.00	1″	+.10	2″	0.00	10 "	0.00	Warren Scharf Asph. Pav. Co. Northern Pav. & Const. Co.	10	1.50	+.05		G. M. Ames.	No straight work.
	+.03	Natural		.80	1.00	1½″	0.00	1½″	+.19	10 "	0.00	The Barber Asph. Pav. Co. Parker Washington Pav. Co. Gilsonite Roofing & Pav. Co.	8	1.40	+.03	2.37	R. M. Waddell.	
4.00	—.11					1″	+.10	1½″	+.19	10 "	0.00	Western Paving & Supply Co. Warren-Scharf Asph. Pav. Co. Barber Asph. Pav. Co.	10	1.50	+.05	2.23	W. K. Eldridge.	
6.00	—.21	Portland	2.50	.40	1.00	No	+.28	2″	0.00	No	+.18	Alcatraz Paving Co.	10	2.00	—.01	2.04	F. M. Olmstead.	
	+.04	Natural	.55	.65	1.10	1″	+.10	2″	0.00	5 "	+.15	Warren Scharf Asph. Pav. Co. Western Pav. & Supply Co. Barber Asph. Pav. Co.	10	1.50	+.05	2.19	Chas. J. Poetsch.	Price, including grading, $2.00.
3.00		Natural	.80	.55	1.35	1″	+.10	2″	0.00		?		8	1.75	—.04		G. W. Sublette.	
6.00	—.45	Portland	2.84	.75	1.25	½″	+.19	2½″	—.19	10 "	0.00	Northern Paving & Const. Co.	10	1.25	+.07	2.87	John R. Barlow.	Rock Asphalt.
		Portland Natural				1½″	0.00	2″	0.00	10 "	0.00	Barber Asph. Pav. Co. Metropolitan Pav. Co.					Ernest Adam.	
8.00	—.40	Portland		2.02	2.02	1½″	0.00	2″	0.00	5 "	+.15	Louisiana Improvement Co. General Asph. Co. of France Southern Asph. Pav. Co.	10½	1.50	+.05	2.30	W. J. Hardee.	
4.80	—.25	Natural	.95	.50	2.20	1½″	0.00	1½″	+.19	10 "	0.00	Cleveland Trinidad Pav. Co.	10	1.25	+.08	2.65	T. C. Hatton.	Price, including grading, $2.83.
5.83/	—.15	Portland	2.50	.45		1″	+.10	2″	0.00	10 "	0.00	Barber Asph. Pav. Co. Atlantic Pav. Co. Alcatraz Asph. Pav. Co.	8	2.00	—.07	2.58	Jacob Wund.	
					NO ASPHALT.												J. L. Temple.	
5.50		Portland	2.50 3.25	@1.00	@1.00	No	+.28										M. K. Miller.	California Bituminous Rock Asphalt.
					NO ASPHALT LAID IN 1900.												A. F. Parker.	None laid since 1894.
5.00	—.03	Natural	.85 to .75	.65 to .75	1.35 1.45	1½″	+.00	1½″-2″	+.10	5 "	+.15	Barber Asph. Pav. Co. Alcatraz Asph. Pav. Co. The Grant Paving Co.	10	1.65 1.85	+.02	2.35	A. Rosewater.	
4.50	0.00	Natural	.55	1.00	1.50	1″	+.10	1½″	+.19	5 "	+.15	Warren-Scharf Pav. Co. Barber Asph. Pav. Co. Bermudez Asph. Pav. Co.	10	1.50 1.75	+.02	2.42	H. E. Beasley.	
		Portland Natural				1″	0.00	2″	0.00	5-10 "	+.07	Vulcanite, Penna. & Alcatraz Pav. Cos. Richardson & Ross.					Wm. B. Brooks.	
	—.15	Natural	@.70	.65	1.70	1″	+.10	2″	0.00	5 "	+.15	Pittsburg Asph. Pav. Co. Penna. Asphalt Pav. Co.	9-10	1.50 1.60	+.04	2.58	G. W. Wilson.	

NEW YORK	2.556	6″	1-3-6	5.83/	—.15	Portland	2.50	.45		1″	+.10	2″	0.00	10 “	0.00	Barber Asph. Pav. Co. Atlantic Pav. Co. Alcatraz Asph. Pav. Co.	8	2.00	—.07	2.58
NORTH ADAMS	NO ASPHALT.																			
*OAKLAND, CAL.		6″	1-3-5	5.50		Portland	2.50 3.25	@1.00	@1.00	No	+.28									
OGDEN CITY	NO ASPHALT LAID IN 1900.																			
OMAHA	2.11	6″	1-2-5	5.00	—.03	Natural	.85 to .75	.65 to .75	1.35 1.45	1½″	+.00	1½″-2″	+.10	5 “	+.15	Barber Asph. Pav. Co. Alcatraz Asph. Pav. Co. The Grant Paving Co.	10	1.65 1.85	+.02	2.35
PEORIA, ILL.	1.96	6″	1-1½-4	4.50	0.00	Natural	.55	1.00	1.50	1″	+.10	1½″	+.19	5 “	+.15	Warren-Scharf Pav. Co. Barber Asph. Pav. Co. Bermudez Asph. Pav. Co.	10	1.50 1.75	+.02	2.42
*PHILADELPHIA	2.25 2.50	6″	1-3-6			Portland Natural				1″	0.00	2″	0.00	5-10 “	+.07	Vulcanite, Penna. & Alcatraz Pav. Cos. Richardson & Ross				
PITTSBURG	2.44	6″	1-2-4		—.15	Natural	@.70	.65	1.70	1″	+.10	2″	0.00	5 “	+.15	Pittsburg Asph. Pav. Co. Penna. Asphalt Pav. Co.	9-10	1.50 1.60	+.04	2.58
PROVIDENCE, R. I.	2.65	6″	1-2-6	5.10	—.29	Portland	2.20	.50 to .75	2.00	1½″	0.00	1½″	+.19	5 “	+.15	Narragansett Imp. Co.	10	1.50 1.75	+.05	2.75
RACINE	NO ASPHALT.																			
ROCHESTER, N. Y.	2.11	6″	1-2-4	4.00	—.05	Natural	.70	1.00	1.10	1″	+.10	2″	0.00	10 “	0.00	Warren Scharf Pav. Co. Vulcanite Pav. Co. Barber Asph. Pav. Co.	8	1.50	0.00	2.16
SALT LAKE CITY	NO ASPHALT LAID IN 1900.																			
SAN ANTONIO	1.995	6″	1-2-4	4.40	—.18	Natural	1.50	1.00	.75	No	+.28	2″	0.00	10 “	0.00	Parker Washington Pav. Co.	8	1.50	0.00	2.10
SAN FRANCISCO	1.89	6″	1-2½-7	4.86 5.50	—.25	Portland	2.75 to 3.00	.70	1.25 to 1.50	No	+.28	2½″	—.19	No	+.18	City Street Imp. Co. Union Pav. & Const. Co. San Francisco Pav. Co.	9	2.00	—.03	1.88
SCRANTON	2.20	6″	1-3-7	@4.20	—.17	Portland	1.80 to 2.00	1.00	1.25	1½″	0.00	1½″	+.19	10 “	0.00	Barber Asphalt Pav. Co.	10	1.50	+.05	2.27
SOUTH BEND, IND.	NO DATA.																			
SPOKANE	2.29	4″	1-3-6	7.65	—.30	Portland	4.50	.70	.95 to 1.00	1½″	0.00	2″	0.00	10 “	0.00	Alcatraz Asph. Pav. Co.	8	1.60 2.00	—.03	1.96
ST. LOUIS	NO ASPHALT LAID IN 1900.																			
ST. PAUL	2.55	6″	1-2-4	3.00	0.00	Natural				1″	+.10	2″	0.00	10 “	0.00	Barber Asph. Pav. Co. American Contr. Co.	10	1.50 1.75		2.65
*SYRACUSE	2.22	6 to 8″	1-2-5 1-3-6		0.00	Natural								5 “	+.15	Syracuse Const. Co. Empire Contr. Co.				
TACOMA	NO ASPHALT.																			
TOLEDO	1.965	6″	1-2-5		0.00	Natural				1″	+.10	2″	0.00	5 “	+.15	Warren-Scharf Pav. Co. Fruin Bambrick Pav. Co. James Bently	10	1.50	+.05	2.26
TORONTO	2.75	6″	1-3-6	5.40 6.00	—.24	Portland	2.24	.79	1.60	¾″	+.14	2½″	—.19	10 “	0.00	The Constructing & Pav. Co. Warren Scharf Pav. Co.	9	1.62	0.00	2.46
UTICA	2.35	5″	1-2-5	@4.00	+.07	Natural	.85	.70 to 1.00	1.25	1″	+.10	2″	0.00	10 “	0.00	Warren-Scharf Pav. Co. Utica Pav. Co. Syracuse Imp. Co.	8	1.50	0.00	2.52
WASHINGTON, D. C.	1.79	6″	1-2-5	3.50	—.07	Natural	.70	@.40	@1.25	1½″	0.00	1½″	+.19	5 “	+.15	Barber, Crawford, Southern & Metropolitan Pav. Co.	8	1.20	+.05	2.11
WINNIPEG	1.79	4½″	1-3-6	5.74	—.30	Portland	3.65 to 3.80	1.00	1.10	1½″	0.00	1½″-2″	+.09		+.18	Work done by City	9	1.53 to 1.80	0.00	1.76
AVERAGE	**2.29**																			**2.41**

* Are omitted from average of deduced prices in Column "A" on account of insufficient data.

NOTE.—The price given i
prices from the re
that the cost of gr
years is 15c. per yd

5.83/	—.15	Portland	2.50	.45		1″	+.10	2″	0.00	10	“	0.00	Barber Asph. Pav. Co. Atlantic Pav. Co. Alcatraz Asph. Pav. Co.	8	2.00	—.07	2.58	Jacob Wund.	
						NO ASPHALT.												J. L. Temple.	
5.50		Portland	2.50 3.25	@1.00	@1.00	No	+.28											M. K. Miller.	California Bituminous Rock Asphalt.
						NO ASPHALT LAID IN 1900.												A. F. Parker.	None laid since 1894.
5.00	—.03	Natural	.85 to .75	.65 to .75	1.35 1.45	1½″	+.00	1½″-2″	+.10	5	“	+.15	Barber Asph. Pav. Co. Alcatraz Asph. Pav. Co. The Grant Paving Co.	10	1.65 1.85	+.02	2.35	A. Rosewater.	
4.50	0.00	Natural	.55	1.00	1.50	1″	+.10	1½″	+.19	5	“	+.15	Warren-Scharf Pav. Co. Barber Asph. Pav. Co. Bermudez Asph. Pav. Co.	10	1.50 1.75	+.02	2.42	H. E. Beasley.	
		Portland Natural				1″	0.00	2″	0.00	5-10	“	+.07	Vulcanite, Penna. & Alcatraz Pav. Cos. Richardson & Ross					Wm. B. Brooks.	
	—.15	Natural	@.70	.65	1.70	1″	+.10	2″	0.00	5	“	+.15	Pittsburg Asph. Pav. Co. Penna. Asphalt Pav. Co.	9-10	1.50 1.60	+.04	2.58	G. W. Wilson.	
5.10	—.29	Portland	2.20	.50 to .75	2.00	1½″	0.00	1½″	+.19	5	“	+.15	Narragansett Imp. Co.	10	1.50 1.75	+.05	2.75	O. F. Clapp.	
						NO ASPHALT.												P. H. Connolly.	
4.00	—.05	Natural	.70	1.00	1.10	1″	+.10	2″	0.00	10	“	0.00	Warren Scharf Pav. Co. Vulcanite Pav. Co. Barber Asph. Pav. Co.	8	1.50	0.00	2.16	E. A. Fisher.	Price, including grading, $2.26.
						NO ASPHALT LAID IN 1900.												John E. Dooley.	None laid during 1900.
4.40	—.18	Natural	1.50	1.00	.75	No	+.28	2″	0.00	10	“	0.00	Parker Washington Pav. Co.	8	1.50	0.00	2.10	E. G. Truhart.	Bituminous Rock Asphalt.
4.86 5.50	—.25	Portland	2.75 to 3.00	.70	1.25 to 1.50	No	+.28	2½″	—.19	No		+.18	City Street Imp. Co. Union Pav. & Const. Co. San Francisco Pav. Co.	9	2.00	—.03	1.88	E. G. Morser.	Bituminous Rock, 80 miles pavements.
@4.20	—.17	Portland	1.80 to 2.00	1.00	1.25	1½″	0.00	1½″	+.19	10	“	0.00	Barber Asphalt Pav. Co.	10	1.50	+.05	2.27	Jos. T Phillips.	Price, including grading, $2.35.
						NO DATA.												W. M. Whittem.	
7.65	—.30	Portland	4.50	.70	.95 to 1.00	1½″	0.00	2″	0.00	10	“	0.00	Alcatraz Asph. Pav. Co.	8	1.60 2.00	—.03	1.96	Otto A. Weile.	
						NO ASPHALT LAID IN 1900.												William Popp.	Last laid November, 1899.
3.00	0.00	Natural				1″	+.10	2″	0.00	10	“	0.00	Barber Asph. Pav. Co. American Contr. Co.	10	1.50 1.75		2.65	O. Clausen.	
	0.00	Natural								5	“	+.15	Syracuse Const. Co. Empire Contr. Co.					R. R. Stuart.	Have used Portland Cement.
						NO ASPHALT.												Norton R. Taylor.	
	0.00	Natural				1″	+.10	2″	0.00	5	“	+.15	Warren-Scharf Pav. Co. Fruin Bambrick Pav. Co. James Bently	10	1.50	+.05	2.26	Wm. F. Brown.	
5.40 6.00	—.24	Portland	2.24	.79	1.60	¾″	+.14	2½″	—.19	10	“	0.00	The Constructing & Pav. Co. Warren Scharf Pav. Co.	9	1.62	0.00	2.46	C. L. Fellows.	$2.30 for 2 in. surface, 4 in. concrete. $2.75 for 2½ in. surface, 6 in. concrete.
@4.00	+.07	Natural	.85	.70 to 1.00	1.25	1″	+.10	2″	0.00	10	“	0.00	Warren-Scharf Pav. Co. Utica Pav. Co. Syracuse Imp. Co.	8	1.50	0.00	2.52	P. L. Schultze.	
3.50	—.07	Natural	.70	@.40	@1.25	1½″	0.00	1½″	+.19	5	“	+.15	Barber, Crawford, Southern & Metropolitan Pav. Co.	8	1.20	+.05	2.11	C. B. Hunt.	Price given for sand and stone does not include haul.
5.74	—.30	Portland	3.65 to 3.80	1.00	1.10	1½″	0.00	1½″-2″	+.09			+.18	Work done by City	9	1.53 to 1.80	0.00	1.76	H. N. Ruttan.	

2.41

n “A”

NOTE.—The price given in this column is obtained by reducing the specifications and prices from the respective cities to Buffalo specifications and prices. Assuming that the cost of guarantee for the first 5 years is 3c. per yd. and for the second 5 years is 15c. per yd.; total, 18c. per yd.

In order to lay intelligently an asphalt pavement one must first understand its component parts. It is made up of the foundation, binder course and wearing surface. The foundation is of great importance, as it must sustain the load, the asphalt having no strength of itself. Old stone and macadam pavements have been used as foundations with good results, but a hydraulic concrete base six inches thick will be most satisfactory. The binder course is made up of hard crushed stone, ranging in size from those measuring one and one-fourth inches in its greatest dimension down to what will be retained on a No. 10 sieve. This stone is mixed with sufficient paving cement to thoroughly coat all the stones and bind them together, but without filling the voids. It is then spread upon the base at a temperature of about 250° F. in such quantity as will produce the proper thickness when rolled. The object of the binder is to connnect the wearing surface to the concrete, and as a thickness of one inch will do this it seems unneccessary to use any more.

The wearing surface is a bituminous concrete, the matrix being sand and pulverized mineral matter cemented together by the asphalt. The quality and size of the sand is important. It should be clean, sharp and silicious in character. There is some difference in opinion as regards its size. Generally speaking it should be of such size as to have as few voids as possible, grading up to that which will just pass a No. 10 sieve. The following table shows sizes used in various places:

	PERCENTAGES RETAINED BY SIEVES.							Passing
	10-mesh.	20-mesh.	40-mesh.	60-mesh.	80-mesh.	100-mesh.	200-mesh.	200-mesh.
Recommended by Mr. Dow, Inspector of Asphalt, Washington, D. C.	0.00	12.00	25.00	20.00	10.00	18.00	*15.00	
Toronto, Canada	0.00	0.24	2.69	11.80	10.85	24.72	32.65	17.05
Brooklyn, N. Y.	2.18	10.52	27.17	26.58	9.54	2.06	*21.95	
Brooklyn, N. Y.	13.25	18.21	24.34	16.15	3.68	5.60	*18.70	

* Passing 100-mesh.

The theory of the mixture is to have every grain of sand and each particle of mineral matter coated and all the voids filled with asphalt, the voids being so small as to require the least amount in one volume of asphalt. The sand that will carry the most bitumen under these conditions will give the best results. The amount generally specified is from 10 to 11 per cent, by weight of wearing surface. The mineral matter is used to reduce the voids, and consists of pulverized limestone or silicious matter.

The collection of machinery where the mixing is done is called the plant. Briefly it consists of apparatus for heating

FIG. 4.—UNION SQUARE, WEST, NEW YORK.

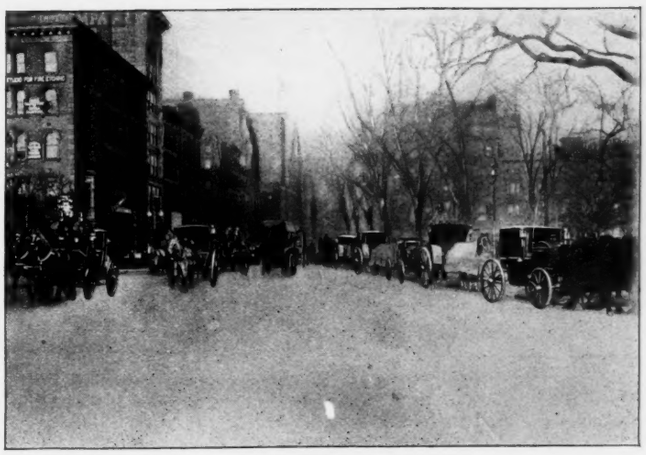


FIG. 5.—VIEW OF FIFTH AVE., LOOKING UP FROM 23D ST., NEW YORK.

the sand, making the asphaltic cement and mixing the different ingredients.

The sand is heated to a temperature of about 450° F., dumped into a pug mill holding about eight cubic feet, the mineral matter added cold, followed by the asphaltic cement at a temperature of about 350° F., and the whole thoroughly mixed for about 45 seconds, when it is dumped into a cart waiting to receive it, when the operation is repeated.

The asphaltic cement is made by melting the refined asphalt, adding the required amount of flux and agitating the entire mass for about eight hours by mechanical means or an air blast till it is one homogeneous mixture. Upon the character of the cement depends the character of the pavement. If it contains too much petrolene the resulting pavement will be too soft, and if too little the pavement will be hard, liable to crack and disintegrate under traffic. An instrument has been devised for measuring the hardness of the cement at a standard temperature so that it can be exactly determined. The deciding upon the required hardness is the province of an expert. After being mixed the material should be taken to the street at a temperature of about 275°, spread upon the foundation smoothly and evenly to such a depth as will produce the required depth after compaction. This depth is generally taken at two inches. During the raking all lumps should be carefully broken up and the surface rolled by a roller operated by two or three men. Hydraulic cement is then spread loosely over the pavement, which should then be rolled with a five-ton steam roller, followed in a short time by one weighing ten tons. The object of the different rollers is to produce compression gradually, as the use of a heavy roller on the soft material is liable to push, rather than compress, producing an uneven surface. The compression should be applied as near vertically as possible. The rolling is continued until the pavement is thoroughly consolidated. As a general rule the above system of rolling should complete 2,000 square yards in ten hours.

In some cities it is considered necessary to lay a gutter of stone or vitrified brick next to the curb, some two or three feet wide, to resist the abnormal action that occurs there. Other officials, however, lay the asphalt up to the curb, taking the precaution to paint a space twelve inches wide with asphaltic cement and ironing it in with a hot smoothing iron, so as to make the pavement positively impervious to water.

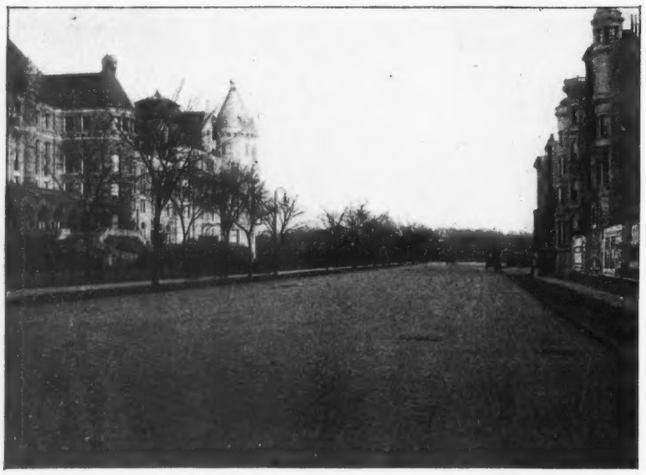


FIG. 6.—VIEW OF SEVENTY-SEVENTH ST., NEW YORK.

In what has been said in this article reference has been made to asphalt pavements as laid in America. Space will not admit taking up the rock asphalts of Europe.

Another form of asphalt in this country is that known as asphalt block pavements. In this system blocks of asphalt are made at a central station, composed of asphaltic cement and crushed trap rock of about the size described for binder. After being mixed the material goes to the press at a temperature of about 300° F., where each block is subjected to a pressure of 120 tons. These blocks are of two sizes, 4 x 12 x 3 inches deep and 4 x 12 x 4 inches deep, according to the traffic on the street where they are to be laid. While not having been used to so great an extent as the sheet asphalt, pavements laid in this way have always proved satisfactory. It is claimed for the blocks that they can be made absolutely uniform, or, if defective, the bad blocks can be discovered before shipment; that, while having all the good features of sheet asphalt, the individuality of the blocks makes the pavement less slippery, and that the pavement is more durable under heavy traffic. Figure 6 shows a view of Seventy-seventh street, Manhattan, looking east from Ninth avenue.

The question is often asked: Can the ordinary city engineer, even if he know the requirements of a good pavement, satisfy himself that the work is being done in a proper manner, with the proper material? The answer is, Yes. Many of the large cities have established laboratories, with competent chemists in attendance, who examine carefully the material as it is being laid. But small cities cannot afford this expense. They can, however, for a comparatively small amount, have a standard of asphaltic cement, in character and quantity, size of sand to be used, established by an expert. When the material is being laid small samples can be sent to the expert by mail, who can examine them, and if they vary materially from the standard, have the mixture changed at once. It may be said that by that time the material will be in the work. While this is so, it must be remembered that asphalt contractors, laying pavements under a five years' guarantee, wish to do work well, and after a standard has been given them, will not vary from it materially, especially when they know samples of the mixture are being constantly sent to the chemist. At least, one laboratory in this country is working on these lines with great success.

When asphalt pavements were first adopted it was thought that they could not be used in small cities on account of the cost of a plant. This difficulty has been overcome by the use of asphalt blocks, and also by the use of plants, built upon railroad cars, that can be readily moved from one city to another. The mixture for the wearing surface, in a few instances, has been made at a central plant, carried to the location to be used, reheated, and then laid with comparatively good results. The most notable instance of this kind is where recently the mixing was done at Long Island City, the material carried to Havana, Cuba, where it was reheated and then laid in the usual manner.

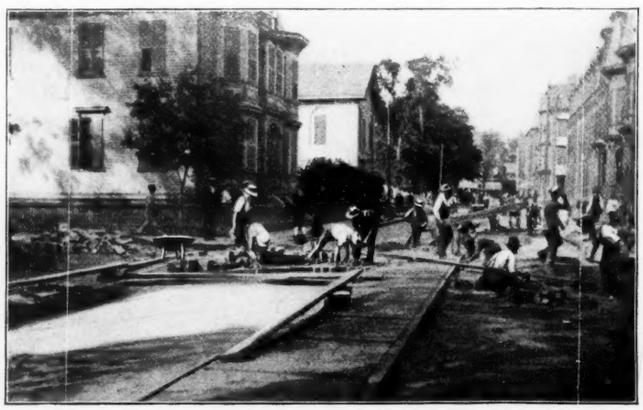
The cost of an asphalt plant depends upon its size and elaborateness. The city of Detroit, in the month of January, 1901, contracted for a city plant with a capacity of from 1,300 to 1,400 square yards of wearing surface in eight hours, for $10,000, including building complete.

NO TWO-LEGGED STOOL IN THIS.

BETWEEN Buffalo and New York City along the line of the Lackawanna Railroad is to be seen some of the most beautiful and picturesque scenery of America; mountains, valleys, streams, and highly-cultivated farms, and it also cuts through the very heart of the coal fields of Pennsylvania, presenting views found nowhere else in this country. As well try to enjoy a good dinner seated on a two-legged stool at a rickety table in an untidy room, as to enjoy the most beautiful scenery in uncomfortable surroundings. The Lackawanna has the most perfect equipment, and with a roadbed as solid as rock, you glide along in comfort as smoothly as with rubber-tired wheels on an asphalt pavement, and with employees ever courteous, the traveler scarcely realizes that he has covered the 410 miles, the shortest route between Buffalo and New York.—*Toledo Commercial.*

BRICK PAVEMENT IN CAMBRIDGE.

CAMBRIDGE is one of the most enterprising cities in New England—in fact in the United States. It is thoroughly up-to-date in its methods and conducts its various departments upon business principles. None is better managed than the Department of Streets, by Superintendent Charles A. Brown. The achievements of this department from year to year are something worthy of note, because it constructs so large a per cent. of its streets. It brings into play all the modern machinery that can be employed in the construction and



CAMBRIDGE—PLACING THE BRICKS ON SAND CUSHION.

CAMBRIDGE—ROLLING WITH TWO-AND-ONE-HALF-TON STEAM ROLLER.

maintenance of streets, such as stone crushers, road rollers—several sizes—street sweepers, etc., and performs the work in a most creditable manner.

Among the permanent improvements made last year was the paving with brick of Pearl street and Harvard Square, at a total expense of $31,325.19. Before this work was undertaken an exhaustive investigation of the subject of brick paving was made by a special committee appointed for that purpose. The improvement was started on another street the season before, and the vitrified brick were supplied by the Eastern Paving Brick Company, of Catskill, N. Y., and a more expensive brick, furnished by Higley, Keplinger & Company, of Canton, O., was secured to complete the work.

The work on Pearl street is shown in its different stages by the accompanying illustrations. The Street Railway Company, during the construction of the pavement, voluntarily withdrew its cars from that street, which enabled Mr. Brown to perform an exceedingly difficult task in a thorough and economical manner.

Thirty-six trees, some of them over two feet in diameter, were removed, edgestones were reset and brick sidewalks were relaid through the entire street. As all abutting property owners were notified in ample season to look after their water, gas and sewer pipes, there should be no necessity for disturbing the surface of this street for several years to come.

The improvements in Cambridge have attracted considerable attention in Massachusetts, and an unusual number of committees and visiting city officials have inspected the newly paved streets. Besides these the Massachusetts Highway Association, composed of officials connected with and interested in street work, devoted an entire day to the inspection of the streets and observation of the work in operation at that time in the several divisions of the department.

CAMBRIDGE—MIXING AND PLACING CONCRETE BASE.

Cambridge, among other Massachusetts cities, has been much benefited by the working of the franchise tax on street railways. Under the old law the tax was distributed among the towns and cities in which the shareholders lived; the new law provides that the tax shall be distributed among the cities and towns through which the companies operate their cars, and the amount paid to each city or town is based on the number of miles of tracks in the public highways on September 30 of the preceding year. By the operation of the new law Cambridge received in December, 1898, $50,965.53; in December, 1899, $47,569.33, and in March, 1900, $19,933.29. The greater part of these sums has been expended upon the permanent improvement of the principal streets.

CAMBRIDGE—SPREADING PORTLAND CEMENT GROUT.

THE ROAD ROLLER PAYS FOR ITSELF.

MAYOR PRICE, of Elgin, Ill., calls attention, in his annual message, to the practical usefulness of the road roller recently purchased by his city. It is the policy of the present administration to turn an honest dollar for the benefit of the taxpayers whenever it is possible. In referring to this phase of the question the Mayor said:

"For its use by the contractor on Chicago street pavement the city received $800, and it is expected the city will receive several hundred dollars for the use of same on the pavement now to be laid on Forest avenue, Brook street and Chicago street. Certainly enough to pay one-half the cost of the roller. This machine arrived too late in the season to be of any great use upon the streets for the reason that in some of the wards all, or nearly all, the funds were exhausted. This season this machine should be used in macadamizing some of the most important streets upon which there are no street car tracks.

"Some unfavorable comment has been made as to the purchase of this roller. When the patrol wagon was bought during the last days of my former administration, it was termed a folly, and the gentleman whom the people elected as mayor refused to have the wagon used, but had it stored for months. Where is the man to-day who is bold enough to condemn it? Less than five years from to-day, when the streets of this city are permanently improved by the work of this machine, the same scoffers will be singing its praise. I believe the future will show that the buying of this roller was one of the best investments this honorable council ever made. The next thing for this department is to own a gravel pit."

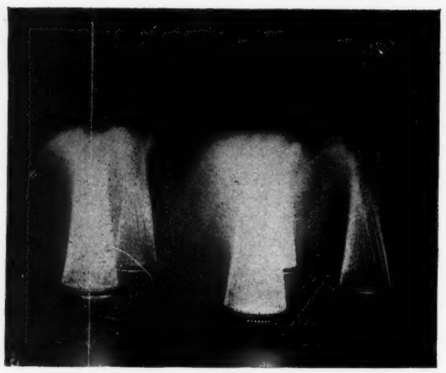
ASPHALT PAVEMENT IN UNITED STATES.

Cities.	Sheet and block asphalt pavement, sq.yds.	Cities.	Sheet and block asphalt pavement, sq.yds.
New York, N. Y.	4,821,600	Manchester, N. H.	51,526
Chicago, Ill.	1,572,000	Utica, N. Y.	545,118
Philadelphia, Pa.	3,893,985	Peoria, Ill.	174,606
St. Louis, Mo.	301,853	Charleston, S. C.	17,130
Boston, Mass.	225,811	Savannah, Ga.	140,813
Baltimore, Md.	400,961	Salt Lake City, Utah.	64,144
Cleveland, O.	212,900	San Antonio, Tex.	4,850
Buffalo, N. Y.	4,007,454	Duluth, Minn.	.....
San Francisco, Cal.	.....	Erie, Pa.	199,453
Cincinnati, O.	418,811	Elizabeth, N. J.	.....
Pittsburg, Pa.	1,090,000	Wilkesbarre, Pa.	206,114
New Orleans, La.	402,000	Kansas City, Kansas.	181,767
Detroit, Mich.	503,397	Harrisburg, Pa.	90,516
Milwaukee, Wis.	251,856	Portland, Me.	.....
Washington, D. C.	3,027,788	Yonkers, N. Y.	135,551
Newark, N. J.	616,071	Norfolk, Va.	20,000
Jersey City, N. J.	232,789	Waterbury, Conn.	2,600
Louisville, Ky.	237,136	Holyoke, Mass.	19,866
Minneapolis, Minn.	199,978	Fort Wayne, Ind.	127,152
Providence, R. I.	80,792	Youngstown, O.	76,037
Indianapolis, Ind.	718,784	Houston, Tex.	78,029
Kansas City, Mo.	1,462,674	Covington, Ky.	74,567
St. Paul, Minn.	297,278	Akron, O.	17,427
Rochester, N. Y.	687,063	Dallas, Tex.	14,918
Denver, Col.	435,636	Saginaw, Mich.	100,448
Toledo, O.	397,519	Lancaster, Pa.	21,728
Allegheny, Pa.	481,139	Lincoln, Neb.	10,922
Columbus, O.	502,275	Brockton, Mass.	.....
Worcester, Mass.	7,820	Binghamton, N. Y.	117,291
Syracuse, N. Y.	484,353	Augusta, Ga.	51,398
New Haven, Conn.	69,518	Pawtucket, R. I.	919
Paterson, N. J.	37,990	Altoona, Pa.	105,842
Fall River, Mass.	5,700	Wheeling, W. Va.	.....
St. Joseph, Mo.	158,211	Mobile, Ala.	.....
Omaha, Neb.	731,820	Birmingham, Ala.	1,220
Los Angeles, Cal.	313,327	Little Rock, Ark.	.....
Memphis, Tenn.	.....	Springfield, O.	.....
Scranton, Pa.	280,453	Galveston, Tex.	.....
Lowell, Mass.	20,470	Tacoma, Wash.	58,000
Albany, N. Y.	164,133	Haverhill, Mass.	.....
Cambridge, Mass.	4,370	Spokane, Wash.	33,975
Portland, Ore.	106,928	Terre Haute, Ind.	78,013
Atlanta, Ga.	46,000	Dubuque, Ia.	100
Grand Rapids, Mich.	105,600	Quincy, Ill.	.....
Dayton, O.	363,243	South Bend, Ind.	47,245
Richmond, Va.	6,400	Salem, Mass.	3,042
Nashville, Tenn.	.....	Johnstown, Pa.	.....
Seattle, Wash.	.....	Elmira, N. Y.	77,596
Hartford, Conn.	185,262	Allentown, Pa.	.....
Reading, Pa.	113,617	Davenport, Ia.	.....
Wilmington, Del.	334	McKeesport, Pa.	.....
Camden, N. J.	158,550	Springfield, Ill.	.....
Trenton, N. J.	46,659	Chelsea, Mass.	.....
Bridgeport, Conn.	39,341	Malden, Mass.	.....
Lynn, Mass.	.....	Topeka, Kans.	194,000
Oakland, Cal.	21,394	Sioux City, Ia.	76,070
Lawrence, Mass.	.....	Knoxville, Tenn.	.....
New Bedford, Mass.	5,012	Chattanooga, Tenn.	78,890
Des Moines, Ia.	.....	Superior, Wis.	.....
Springfield, Mass.	4,976	Rockford, Ill.	26,268
Somerville, Mass.	.....	Taunton, Mass.	.....
Troy, N. Y.	33,478	Joliet, Ill.	68,821
Hoboken, N. J.	94,408	Canton, O.	.....
Evansville, Ind.	46,033	Butte, Mont.	.....
		Auburn, N. Y.	1,000

ELECTRIC FOUNTAINS.

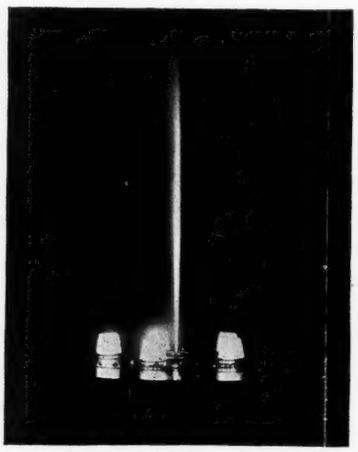
By Frederick W. Darlington.

Municipalities are awakening to the fact that public improvements must combine the useful with the ornamental. The citizens of the modern city will be satisfied with nothing less. It does not require the expenditure of any more money to make an improvement beautiful than to have it severely plain. The "City Beautiful" will be the product of the twentieth century, and there is no good reason why the work of civic adornment should not commence immediately The people demand that the public moneys shall be expended so as to obtain the greatest good to the greatest number.



CRYSTAL PALACE, LONDON.

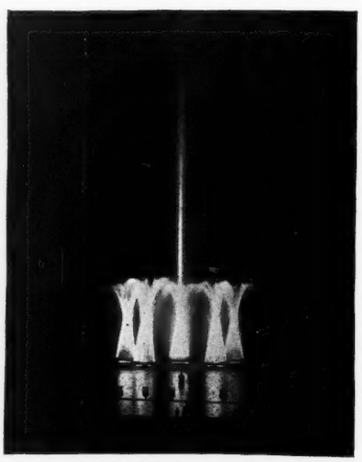
One of the imperative duties of the municipality is to provide adequate means for the education of its youth, and for this purpose millions are expended annually for the maintenance of the public school system. In most States attendance at school is made compulsory, but there is an old saying that, "You can lead a horse to water, but you cannot make him drink." The same may be said of the child; you can compel him to attend school, but you cannot make him learn.



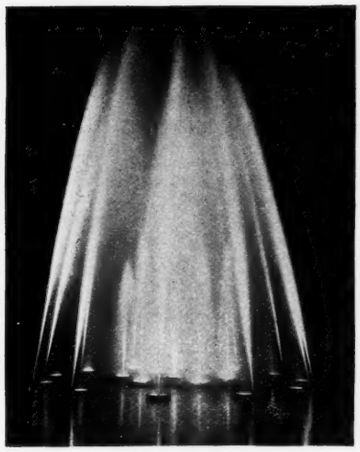
CRYSTAL PALACE, LONDON.

There are ways and means, however, for instilling into the mind a large amount of instruction of a highly useful character, not only without compulsion, but so as to give pleasure at the same time—in fact, it may be accomplished without even arousing the child's suspicion that he is being taught. The chief method in achieving this end is found in civic adornment, especially in the places where the people and children congregate in large numbers, such as parks, squares and open places.

The public fountain has been used in such a capacity from time immemorial with varying success, for the people would soon tire of a fountain that would admit of no change in its form of spray and which was absolutely valueless after dark. It remained for the latter part of the nineteenth century to produce a fountain, which, with its combination of color and water effects, provides a never ending source of amusement, not only for the children, but for men and women. The electric fountain



CRYSTAL PALACE, LONDON.

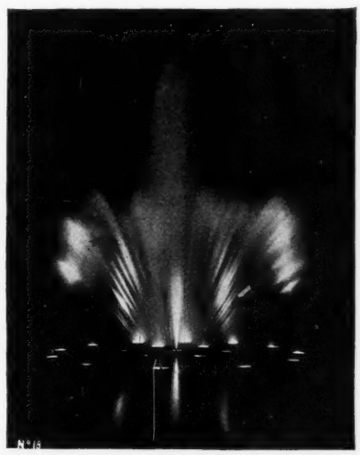


PROSPECT PARK, BROOKLYN.

of to-day is a thing of beauty and a source of education for the æsthetic side of human character, and when that fountain is installed in a park or public square it is impossible for thousands of people—in fact the great mass—to escape its educational influences.

The popularity of the electric fountain at the World's Fair in 1893, as well as the fountains which have now been in use several years in Jackson Park, Chicago, and Prospect Park, Brooklyn, has thoroughly demonstrated not only the beauty, but the utility of the electric fountain for adorning the modern city. The possibilities of its various adaptations to municipal needs and conditions seem to be endless.

The construction requires the skill of an architect, electrician and hydraulic engineer in order that it may be best suited to a given location. While it is, in some respects, somewhat complicated, it is not so expensive as might be supposed, either in its original cost or maintenance.



PROSPECT PARK, BROOKLYN.

The famous fountains at Versailles, near Paris, have attracted tourists from far and wide, and yet they belong to the old-fashioned class. If they were equipped with the apparatus which would transform them into electric fountains, their fame would be largely increased. Add to this a changing water display, that is found in the modern fountain, and the value is still more enhanced. The changes in both the water display and color schemes that are possible with the electric fountain are too numerous to mention, which produces a novelty that never becomes wearisome. There is such warm competition between cities nowadays, especially among the smaller ones, that it would not be a bad idea for the merchants of a small town or city to erect such a fountain at their own expense, in some public square, and advertise to run it on certain evenings, or every evening of the week, simply for the sake of drawing trade to their stores. This side of the scheme has already been utilized by the traveling "Midway," and been pronounced a success. The manager of one of the numerous traveling "Midways" said that the small electric fountain which he had was his best drawing card.

PROSPECT PARK, BROOKLYN.

WILLOW GROVE PARK, NEAR PHILADELPHIA.

To return to the question of civic adornment, it is important to call attention to the possibilities of improving, at comparatively small cost, even the small parks and squares in the smaller cities. Then, too, there are many small squares, circles or ovals near some monument, in the larger cities, which could be greatly improved by the addition of an electric fountain.

Although the electric fountain was almost perfect before, yet recent improvements have made the action of even the largest fountains entirely automatic, or a series of fountains may be worked in the same manner from a central station. By this attachment the water displays and color schemes can be changed instantaneously. All these changes can be effected by a simple push of the button.

The general impression obtains that an electric fountain consists of "simply a few jets with an electric light under them," which is quite erroneous. The fact is, that while the operation of the fountain is simple enough, its construction requires great engineering skill in the arrangement of the necessary pipes and the building of the water-tight compartment under the fountain for holding the light and color-producing apparatus.

Another wrong impression is that it requires a large amount of water to operate the fountain, whereas a simple and inexpensive device permits the water to be used over and over again.

The electric fountain is more generously used in European cities than on this side of the water. In England it is even being used to embellish many of the large estates of the

WILLOW GROVE PARK, NEAR PHILADELPHIA.

nobility. There is one now being constructed on an estate in the south of England, located out in the center of a small lake and about 1,000 feet from the house, which overlooks the lake and its surroundings.

From the large bay window of the dining room a fine view of the situation is obtained. The controlling instruments are placed within a roller top desk in this bay window, where the owner sits and produces any combination of water and color effect that the human fancy can dictate. By turning a single switch the fountain will proceed with a series of predetermined and prearranged displays, continuing for an hour and a half before the series is finished, each one lasting but two minutes. The apparatus can be arranged to produce the effects once every minute, and a simple device permits of a change in the arrangement of designs as often as desired, so that the interest in the fountain may be perpetual.

The illustrations accompanying this article are of fountains in actual use. The variety of effects shown simply serves to give an idea of the endless designs which may be secured with the well equipped modern electric fountain. In each case, except as otherwise noted, the photographs were taken at night by the light of the fountain itself, which shows, in a measure, the brilliancy of the exhibition, but it is impossible to reproduce the magnificent color effects.

THE JUVENILE COURT OF CHICAGO.

BY WILLIAM O. LA MONTE.

WILLIAM O. LA MONTE,
Clerk of Juvenile Court, Chicago.

LAST year the Legislature of Illinois enacted a law to regulate the treatment and control of dependent, neglected and delinquent children. This is usually called the Juvenile Court Law, because it provides for a separate court although it is still the Circuit Court. July 1, 1899, the Circuit Court judges selected Hon. Richard S. Tuthill to preside therein and he has held the court from its inception, except in vacation time. His patience, fatherly interest, tact, love for and knowledge of children, makes his appointment particularly fitting. All of the circuit judges have held the court during vacation times and have marveled at its great work for good. The venerable chancellor, Murray F. Tuley, declared, in a formal opinion, that he believed it did more real good in one year than our five criminal courts could accomplish in twenty years.

The law was the result of aroused public opinion, largely stirred by Grand Jury reports and the active work of all of the women's clubs, and was drafted by a committee of the Bar Association.

It gives practical effect to the new idea abroad in the land that the State ought to treat the children within its borders just as a wise parent would treat his own children.

When a child under sixteen is brought before a magistrate charged with any offense he must immediately be transferred to the Juvenile Court for disposition. He is not allowed to associate with older and hardened criminals at any stage of the proceedings. Before trial he is kept at a Juvenile Detention Home, which is the private residence of Rev. A. C. Dodds. He and his wife are devoted to the work. A couple of elderly policemen in plain clothes assist them in controlling the boys. Generally, on the first appearance of the boy, he is given a fatherly talk in kindly tones, warned and paroled to a probation officer.

THE PROBATION SYSTEM.

The best feature of the law is its wise provision of the friendly helper, both to the boy and the court, called the probation officer. I think the germ of this idea may be said to be an ordinance of the city of Nuremberg (Nürnberg) passed in A. D. 1527.

We divide the city into districts and have a probation officer commissioned by the court for each district, who is paid from private sources, clubs, churches, societies or individuals, and many volunteers at large, but the court holds the district probation officer responsible. Then we have a wise, fatherly policeman, without any uniform or badge of his office, detailed from each police district, who transfers the boys, notifies parents and witnesses and files the papers.

The boy, if paroled, is told that the probation officer represents the court and must be treated just as if the judge were present.

These visiting probation officers call at the homes, counsel with the parents, and by wise suggestions help the entire family. Sometimes they get the family to move, thus removing a strong temptation from the boy. The bad influence of the "corner gang" is often a menace. They also frequently find employment for parent or boy. They visit the school and file a report every month concerning the boy; his visits to them, theirs to him, or to his home; tell of his surroundings, of his conduct in school or at work. Thus the court is in a position to know all about its wards.

Every boy or girl brought into the court is henceforth a ward of the court. This not only puts him on his good behavior, but is notice to the parents that they must show themselves worthy of the trust reposed in them.

THE FUNDAMENTAL IDEA.

The fundamental legal idea beneath the Juvenile Court is the sound doctrine that all children within the borders of a State are subject to the control of the legislative power and the courts, as representing the people; that, because the law of nature makes most men love their offspring, the sacred trust of caring for children is reposed in parents; but this is not an absolute, paramount or proprietary right, and as soon as the parent proves unfit it is the duty of the State to select a better trustee, the welfare of the child being the highest aim and the moving cause.

These children are not and ought not to be charged with crime, tried for crime, or treated as criminals. The effort is to supply needed parental care, better and more suitable surroundings, training and education. In a republic the law of self preservation requires and justifies the people, through the law and the courts, of course, after fair hearing, to do this.

If delinquent boys are brought in a second time, or have dangerous home surroundings they are sent to the John Worthy School, where they are confined within grounds, but

no cells. Here the teaching force is supplied by the Board of Education, the same as for all our public schools; the boys have five hours a day of manual training and five hours a day for play. The progress of some is wonderful.

The girls are sent, if Catholics, to the House of the Good Shepherd; or, if Protestants, to the Erring Women's Refuge for Reform (average age of inmates under fourteen years) or the State Home for Female Juvenile Offenders at Geneva. All of these are excellent institutions, where the girls are educated and trained in all useful occupations.

DEPENDENT AND NEGLECTED CHILDREN.

The unfortunate children who are dependent or neglected are placed in the Industrial Schools for short periods of training and then in suitable family homes or given in adoption. This law legalizes surrender of children by parent or parents to a duly accredited society for aiding children and finding homes. There is no lack of good homes.

THE WORK.

The first year 1,096 children were paroled to probation officers, of whom 203 were returned to court. Of 256 boys released from the John Worthy School thirty-three were returned into court.

The record of the six months from July 1, 1900, to January 1, 1901, is as follows:

Cases coming before the court	1,223
Disposal of delinquent cases:	
Released on parole to probation officers	404
Committed to John Worthy School (boys)	339
Released from John Worthy School (boys)	284
Remanded to John Worthy School (boys)	68
Boys paroled to officers and returned to court	40
Remanded a third time to John Worthy School (boys)	3
To Chicago Erring Women's Refuge for Reform (girls)	22
To House of Good Shepherd (girls)	13
To State Home for Female Juvenile Offenders at Geneva (girls)	12
Held to grand jury	8
Disposition of dependent cases:	
Illinois Training school farm at Glenwood (boys)	91
St. Mary's Training School for Boys at Feehanville	41
Chicago Industrial School for Girls	58
Illinois Children's Home and Aid Society	44
Illinois Industrial School for Girls at Evanston	36
Guardian Angel's Orphan Asylum (German)	26
St. Vincent's Infant Asylum	21
Visitation and Aid Society	20
Chicago Home for the Friendless	18
Dunning	6
Allendale farm	3

JULY 1, 1900, TO JANUARY 1, 1901.

Causes of delinquency:

Mother—		Father—	
Drunkenness	43	Desertion	113
Death	110	Drunkenness	76
Poverty	106	Death	80
No mother's care	48	No father's care	52
Desertion	28	Poverty	30
Sickness	19	Sickness	13
Insanity	13	Insanity	5
Child incorrigible	3		

The number remanded to the John Worthy School would be much less if it were not for its crowded condition. The court has often released boys long before it otherwise would have done, on this account.

THE ECONOMY OF THE WORK.

The wise economy of this method of treating childen, although it seems a pity to think of money when fixing the status of human lives, is apparent and striking.

Dieting bills for the 400 paroled would have cost $18,000. To try them for crime would have cost $10,000. If the cost of crime in cities is from $5.00 to $7.00 per capita per year, how much will be saved by preventing these boys from starting careers of crime?

Every city would be greatly benefited by the establishment of a Juvenile Court, and any cost incurred would be wisely economical.

REMUNERATION FOR FRANCHISES.

THE right of the municipality to exact compensation from private corporations for franchise privileges, the methods of obtaining and the amount of such compensation are questions of vital interest to every civic corporation in the land. The frequent communications to THE MUNICIPAL JOURNAL, asking for light upon this vexed question are sufficient evidence that the wide-awake city official will be deeply interested in the views of the able controller of New York City, Hon. Bird S. Coler. Mr. Coler prepared a paper to be read at the convention of the League of American Municipalities at Charleston, S. C., in December, 1901. He was unavoidably absent, but his paper was read and received with great attention. In part it was as follows:

"I take it for granted no one will now dispute the proposition that the public should receive remuneration, in one way or another, for the use of its streets by private corporations. The only question is: How can that remuneration be most justly exacted and most successfully collected?

"The City of New York has for over 200 years been dealing with this problem with greater or less success—generally with less. It began leasing its ferry franchises in 1674, and twelve years later its right to control such privileges was confirmed by the famous Dongan charter.

"The granting of franchises for street surface railroads in New York belongs to the history of the last fifty years. During the first half of this period these grants were made directly by the State Legislature, generally without any provision for compensation and always without adequate provision. Unfortunately the most valuable of these franchises were thus disposed of during this time.

"The constitutional amendment of 1874 called for the action of the local municipal authorities, and in 1884 a general law of the State provided for the sale of all such franchises at public auction to the highest bidder, and prescribed a minimum, or upset price, of 3 per cent. of the gross receipts during the first five years of operation and 5 per cent. thereafter.

"Compensation for sub-surface rights, such as those enjoyed by telephone, telegraph, gas, electric light and power, steam heating, refrigerating and other subway corporations, has received scarcely any intelligent consideration. In fact the great value of some of these franchises in a great metropolis like New York has only during the last few years attracted any popular attention whatever.

THE MOST IMPORTANT POINT.

"In my judgment the most important point to emphasize in regard to this subject is that, no matter what the method of exacting compensation may be, it is practically impossible for municipal authorities to make any bargain with a private company which will not appear inadequate to the next succeeding generation. When the most

valuable surface railway franchises in New York City were being disposed of there might have existed some extraordinary far-sighted man who could have forseen the immense growth of the city and prophesied what their value would be in the future. But if such a man had been in a position of sufficient authority to demand what he deemed to be an adequate compensation, the promoters of the railway enterprises would have stood aghast at his figures. The railroads would simply never have been built. And if the railroads had not been built the growth of the city would have been stunted and the prophet would have stood discredited. Here lies the problem then: On the one hand not to discourage enterprising capital and on the other hand to place some limit on its profits. Now, if the city makes a poor bargain, but that bargain has only, say, twenty-five years to run, there is no great harm done; for twenty-five years is as nothing in the life of a great city. But if a franchise be granted in perpetuity or for a very long period—like that of the New York & Harlem Company, which runs until the year 2389—no matter how advantageous the bargain may seem to-day, it is likely to appear quite ridiculous a hundred years from now. Short terms for franchises are, therefore, the most important thing. If that principle be strictly adhered to more than half the fight is won.

METHODS OF EXACTING COMPENSATION.

"As to the methods of exacting compensation, I fear that we suffer somewhat from too much devotion to theories, logic and philosophy. There is no one method which will best fit all cases. There are advocates of the principle of exciting competition by offering franchises for sale at public auction. Others believe in a legislative fixation of arbitrary amounts, either by way of cash payments or percentages on gross or net receipts. Still others believe in granting to local authorities a certain freedom of barter in arranging terms with those seeking to obtain franchises. On the whole, I favor the last mentioned course, though there are conditions under which it is not desirable.

"I think it likely that in the case of a comparatively small, but growing, city, where practically no transportation facilities exist, the method of franchise sale at public auction, with a fixed minimum or upset price, might work well. But where, in large cities, like New York, the chief thoroughfares are already pre-empted; where the existing surface lines are controlled by a monopoly; where the question of transfer facilities practically rules out all newcomers, there can be no such thing as genuine competition. In such cases the local authorities can do much better if given a free hand to bargain in behalf of the city than if compelled to sell at auction. In saying this, however, I am presupposing that the bargaining power shall be vested in either one official or a board of a very few officials of rather more than the average intelligence and integrity, and upon whom the responsibility for any abuse of power can be fixed with certainty. This can never be done in the case of local legislative assemblies. In most of our cities the local Legislatures do not bear the most enviable reputations, and even the best of them are so hampered by legislative conditions as to be inefficient administrators.

"Under the provisions of the Greater New York charter the local Legislature, it is true, possesses exclusive power to grant such franchises, but it is provided that any ordinance granting such a franchise 'shall on its introduction and first reading be referred by the Municipal Assembly to the Board of Estimate and Apportionment, who shall make inquiry as to the money value of the franchise or privilege proposed to be granted, and the adequacy of the compensation proposed to be paid therefor, and no grant thereof by the Municipal Assembly shall be made except on terms approved by vote or resolution of the Board of Estimate and Apportionment.'

"The practical effect of this provision is to leave to the popular legislative body the power to decide the broad question of whether the public interests demand the granting of a franchise, and also to veto the terms proposed by the Board of Estimate and Apportionment, but the latter board is vested with those powers which may be said to relate to the business or commercial aspect of the proposition.

"As the Board of Estimate and Apportionment in the city of New York has always been a more or less efficient body, which has through all the changes of administration generally retained the confidence of the public, this scheme is one which has generally commended itself to students of New York City municipal affairs.

IN GREATER NEW YORK.

"Since the Greater New York consolidation only two grants of franchises have been made under this provision, but the terms of the grants have been decidedly better than those which had previously been obtained by operation of the general railroad law requiring sales of such franchises at public auction.

"On December 5, 1899, the Board of Estimate and Apportionment fixed the money value of the franchises sought by the Kingsbridge Railway Company and the Fort George & Eleventh Avenue Railroad Company as follows:

"Four per cent of the gross receipts during the first five years of operation; 6 per cent. during the second five years; 8 per cent. during the third five years; and 10 per cent. during the remaining ten years.

"These two franchises affected routes in comparatively undeveloped portions of the city, so that the operation of these railroads will not probably be profitable in the beginning. Nevertheless before the expiration of the twenty-five-year term of the grant it is practically certain that the city will be thickly settled in these localities and at the end of the term the city will be free to fix new rates of compensation.

"It seems to me that such a plan as this comes as nearly as possible to the ideal method of exacting compensation for street railway franchises otherwise than municipal ownership and operation.

"There are many important cities of the country which do not possess boards similar in composition to that of the Board of Estimate and Apportionment, but I know of no reason why in such cases the functions performed in the city of New York by the Board of Estimate and Apportionment should not be performed by either the mayor or comptroller of such cities, acting either alone or together. The principal thing is to have the business transaction connected with the granting of such franchises conducted on behalf of the city by the highest type of official possible, and to center the responsibilities so that there can be no escape in case the terms of the grant be manifestly improper. I think is is under such conditions that the best solution of this problem is to be found."

CHICAGO RUNS A PAWNSHOP.

THE city of Chicago is doing more towards reconciling the American public to the pawn shop than any other city in the United States. It is a fact that in spite of its utility, the pawn shop has been forced to brave a more violent storm of antagonism than any other commercial institution.

Men who have established such a business with most honorable motives and with a genuine desire to help unfortunate individuals, while earning a legitimate interest on money loaned, have been unjustly hampered by the dealings of conscienceless brokers. The latter, taking advantage of their customers' need for ready money, have exacted exorbitant interest on sums advanced on articles of real value, and, in this way, created against the institution a prejudice as involuntary as it is unreasonable.

And yet the establishment, with all its drawbacks, is too provident to ever fall into disuse. It is a truth that any institution which affords a means of relief for a vast number of people will be supported by them. Many a man argues that it is better to resort to this method of raising money, than to ask a personal loan of a friend.

All sorts and conditions of men are included among the patrons of the pawn shop; from the very rich, with numerous pawnable articles and no ready money, to the very poor, with few belongings to pledge and no chance of earning money.

By the organization of the Pawners' Society of Chicago this evil will be obviated to a great extent in that city. The modern Shylock has found a competitor in this institution which threatens to undermine his business of preying upon the unfortunate in his hour of greatest need, for it is being talked of in other cities. A few years ago one of the churches of Rochester conducted a pawn shop upon a smaller scale and without the idea of making a profit in the business. It was not long successful, and the secret of its failure, perhaps, may be found in the very fact that it was of a semi-charitable character. While the Chicago pawn shop makes generous concessions as to time, valuation and is not permitted to ask more than the legal rate of interest, yet it is managed with the purpose of making a profit upon the money invested, and it has succeeded.

The institution was created by an act of the Legislature, which, with the high standing of its board of directors, two of whom are appointed by the governor of the State and the mayor of the city, respectively, gives it a respectability and prestige that it is impossible for the ordinary pawn shop to obtain. The society began its business operations a little over a year ago, and from the very first was attended with success. After the first six months it was found necessary to increase the original capital of $50,000 to $100,000, in order to meet the growing demands of the business. Quite recently this sum had to be augmented by a temporary loan of $20,000, in order to carry on the work until the next meeting of the stockholders.

Although many of the ventures of the society have been experimental, the results have exceeded the most sanguine expectations of the directors. This is true of not only the actual profits realized, but of the number and value of the articles which have been pledged, and the amount of money which has been advanced upon them. The final opinion of those who have taken a conservative view of the venture is that such an organization can be made not only a business success, but that a large number of independent, self-respecting persons, in need of temporary financial assistance, will gladly patronize it.

In a recent communication to the MUNICIPAL JOURNAL AND ENGINEER, Mr. John V. Farwell, Jr., who is president of the board of directors, said: "More money is needed at once if the society is to increase its business and its usefulness in the community. Considering the results achieved, the directors have no hesitation in saying that the stock will undoubtedly earn 10 per cent. per annum, and that semi-annual dividends at the rate of 6 per cent. per annum (the maximum allowed by law), can be regularly and safely declared. Although the required year has not yet elapsed on delinquent loans, before sale by auction is allowed, such a large percentage of the first loans have been redeemed, and so many expert appraisements have been secured, that the directors feel sure that all probable losses from such sales have been more than provided for in the above statement.

"From present experience it is quite probable that $500,000 will in a few years be needed to carry the idea of the society to its full and complete development, with its central office and branches in the various thickly settled and needy districts of the city." The following table will be of interest:

STATEMENT BY MONTHS OF LOANS MADE AND REDEEMED.

	Number of Loans.	Amount	Amount. Redeemed.	Number Redeemed.	Interest Earned.	Insurance Earned.
1899.						
November	1,459	$19,185.00	$2,038.50	158	$307.34	$140.17
December	1,406	20,942.00	5,488.00	459	364.52	165.79
1900						
January	1,123	17,962.50	7,117.00	490	509.37	232.58
February	1,092	16,690.50	8,573.50	583	516.16	276.92
March	1,499	21,105.00	9,330.63	682	754.47	344.99
April	1,284	19,750.75	12,024.49	839	723.91	330.19
May	1,339	19,962.00	11,865.88	895	633.82	287.41
June	1,479	23,494.50	14,768.75	1,021	1,140.45	514.80
July	1,694	24,941.00	15,583.00	1,045	989.39	446.93
August	1,597	25,076.50	18,092.75	1,244	1,094.96	496.57
September	1,585	23,465.50	17,810.50	1,181	1,123.13	507.95
October	1,604	25,215.50	17,883.25	1,352	1,184.42	533.69
	17,161	$257,790.75	$140,576.25	9,949	$9,341.94	$4,277.99

The municipal pawn shop is not an American institution by right of discovery, for it has been in existence on the other side of the Atlantic for many years. For more than a century the municipal pawn shop has been one of the recognized features of Paris, Berlin, and later of Leipzig. The Leipzig pawn shop was started for the benefit of the laboring people, and it has loaned hundreds of millions of marks.

In connection with and as a part of the city pawn shop is carried on a savings institution, which is guaranteed by the city, and naturally conducts an enormous business.

Now that the idea has taken root in American soil, its rapid adoption, in some form or another, may be looked for in all, the leading cities of the United States within the next decade.

ALLEGHENY'S LEGAL AID SOCIETY.

No one will be too poor to have a lawyer, if the latest project of the Civic Club, of Allegheny County, Pa., is brought to a successful termination, as there is every prospect of being the case. At its last meeting the club decided to undertake the enterprise, and circular letters have been sent to well-to-do persons interested in charitable work, asking subscriptions to the $1,000 fund, which is needed to give one year trial of it.

The large proportion of foreigners ignorant of their rights, and hence often victims of wrongs for which they can secure no redress, is given as one reason why Pittsburg in particular should have a society of this kind. Cases are said to be numerous in which legal aid, both for prosecution and defense, would save many injustices, which, though usually involving small amounts of money, are still of importance to the sufferers. Several other American cities have societies of this kind which are doing admirable work, notably New York, Philadelphia and Buffalo.

As planned now, the society will be modeled after the Legal Aid Society of New York. The idea is to pay an attorney a salary of $600 per year to take charge of all cases, with $400 for additional expenses. The only cases that will be accepted by the society are those which, upon investigation, prove to be worthy ones, and which involve so small amounts of money as to make them unprofitable to the average lawyer. No criminal or personal injury cases will be considered, and none from persons who are able to secure the services of private counsel. An advisory board of prominent attorneys has been appointed, in addition to the one who will receive a salary for his services.

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AN ACQUISITION.

THE *Municipal and Railway Record* has been purchased by and incorporated with the MUNICIPAL JOURNAL AND ENGINEER. We hereby extend a hearty greeting to these new readers and advertisers whom we include with our JOURNAL family for the first time. We expect to maintain the good name already established by the *Record*, and by continuing the high standard and liberal policy already adopted to do even better.

At first thought it might seem that we had gone out of our field in acquiring this publication, but such is not the fact. The JOURNAL not only includes the field of the *Record*, but much more besides. Street railway people have always been interested in reading the JOURNAL, because it is their largest source of information as to what is transpiring in the municipal world. A large number of managers have already learned to depend upon it. This is true, also, of those who are interested in electrical matters, in so far as they relate to the municipality.

Our new readers will find in the JOURNAL a larger fund of information and besides will have free access to our Information Bureau, which has proven so helpful in the past.

Our new advertisers will reap larger results because of the increased publicity obtained from the larger circulation of the JOURNAL, and, also, from the use of the advance information given in our semi-weekly bulletin.

VENTILATION OF PUBLIC BUILDINGS.

VENTILATION of public buildings is a matter which needs much closer attention than it has had in the past. This is particularly true of the public school house. Nerve force accumulates rapidly in child life, but oxygen is necessary to produce nerve force, and unless the oxygen is supplied in adequate quantities not only will the physical development be retarded, but the very object for which the school was created will be defeated. To obtain the best results from the public school it is absolutely necessary to pay more attention to the supply of oxygen that is furnished to each pupil.

Oxygen is obtainable in abundance and without cost. It is absolutely necessary and essential. No school house ventilated only with windows and doors is sanitary. This is clear upon a moment's reflection, because air cannot be introduced in sufficient quantities without creating draughts. The air in school rooms should be changed every fifteen minutes, if it is intended to surround the children with the conditions which nature demands. To give less than nature demands is not only bad policy, but foolish, when it concerns the lives of school children. To change the air every fifteen minutes, without draughts, demands the installation of a modern heating and ventilating apparatus. This means a large expense in the rebuilding of some of our public school buildings, but not one-tenth of that incurred by not having them. While there are many of the buildings now being constructed that are properly fitted with adequate ventilation, many of the old structures are lacking in this respect. The efficiency of the public school should not be crippled in any way, and money expended for this improvement would be wisely invested.

EDITORIAL COMMENT.

THE police bill, which is being openly pushed along by Governor Odell, has already passed the Senate, and is likely to become a law within a few days. Like any other partisan measure, it has some redeeming features.

CITY Engineers will be much interested in the article on "Asphalt Paving" which appears elsewhere in this number. Mr. Tillson, the author, has just published the most complete work upon that subject that has yet appeared.

THE report of the Street Railway Commission of Chicago, is a model of clearness and justness. Its conclusions show a wise discrimination between the rights of the people and the corporation. It is also an illustration of the American characteristic of fair play.

CITY Engineer Claussen, of St. Paul, Minn., made some timely recommendations in his annual report recently, but none more to the point than the one calling for the purchase of wagons by the city that were better adapted to the work of removing the ashes, garbage and street sweepings.

MAYOR Depinet, of Erie, Pa., in his annual message calls attention to many needs of his city, but none are more pressing than clean streets, a sanitary system for the collection of garbage—including the purchase of wagons adapted to that work—and the placing of street signs at the intersection of all streets.

BOSTON'S play grounds for the children in the crowded tenement districts are reported to have decreased the petty offenses in the park localities. It costs less to maintain small parks and playgrounds than it does to support courts and jails. The small parks should be rapidly multiplied. The children need them.

THE electric light wires which are strung upon poles do a large amount of damage to the trees of the cities every year. This is a strong argument for putting the wires underground, where they belong. City authorities should do all within their power to protect the shade trees, for there are none too many.

A COLUMBIA College professor, of New York City, the other day caused the arrest of an expressman who persisted in expectorating in a street car. The offender received his just deserts. If all those who are interested in the observance of this sensible rule were as consistent as this college professor, there would be fewer violations of this ordinance, but as it is, the law is practically a dead letter.

THE report of the Charter Revision Commission of New York City was submitted to Governor Odell some time ago, and was recently reported by him to the Legislature, but no further action has been taken in the matter. The friends of the commission are perfecting plans to push it through. If it passes at all, it is likely to be unrecognizable because of the partisan amendments which will be tacked on.

THE Socialistic Mayor of Brockton, Mass., in his annual message, advocates public ownership of all public utilities and recommends the installation of a municipal ice plant, repair shop and bath houses, but himself pledges "unswerving fidelity to party principles." A socialism that does not include all the people to the exclusion of "party principles" is a farce. Partisan methods of any stripe are not the best for city government.

SOME of the good citizens of Baltimore are much exercised about beautifying their city. In view of the fact that the city has no sanitary sewers and that it has the largest amount of poor pavements of any city of its size in the United States, it would seem to be wiser for these citizens to confine their efforts to the more practical needs. "The City Beautiful" is greatly to be desired, but the healthful and well paved city is more desirable.

THE assessors of our cities are but men, and, therefore, liable to err, but there does not seem to be an adequate excuse for the almost universal practice of permitting so large an amount of personal property to remain untaxed, and to discriminate in favor of the rich man and the politician when making out the assessment rolls. A faithful and judicious assessor, aided by a strong local paper, could accomplish a great reform in this particular in many cities.

A NUMBER of public spirited citizens of New York are urging, among other practical improvements, the placing of street signs at intersecting streets, recommending the adoption of some uniform plan. This city is well supplied with signs, when compared with most other cities of the country. Nevertheless there is chance for great improvement. One gentleman thinks it would take a million dollars to introduce a scheme which would secure uniformity and efficiency.

THE city of Rochester, N. Y., was recently visited by a serious fire in one of its public institutions in which, for lack of sufficient fire escapes, over forty lives were lost. The Commissioner of Public Safety has commenced a thorough inspection of all large buildings to see that they are adequately equipped with fire escapes. This is a precautionary step which should be taken in every city in the United States. The mayors should see that the proper official has made such an inspection.

THE side entrance, the box stalls and the back rooms of saloons are strongly condemned by many fair-minded citizens of Seattle, Wash. The saloon is looked upon by a large class of citizens as an unmitigated evil, but whether it is or not, there is no good reason why the city authorities should permit constant violations of the law by the saloon keeper. If the back room and back door entrance to a saloon are inimical to peace and order in any community a stringent remedy should be applied.

TAXPAYERS should insist upon the introduction of civil service rules in all appointive offices. This would be the means of a large annual saving. Contrary to good business principles, S. D. Kane, formerly city clerk of Binghamton, N. Y., has been superseded by another, not because he is better fitted for the duties, but rather because he is a partisan of the appointing power. The taxpayers will pay him a good salary while he is learning the business at their expense!

WITH the multiplied uses of high tension electric currents in our cities, there is a more urgent need for the placing of all wires, whether for high or low currents, under ground, where the least possible danger will result from their use. A large number of cities have already obliged the telephone, telegraph and electric power and lighting companies to construct conduits of their own, but the better practice is for the conduit to be laid at the city's expense and an ordinance requiring all companies using wires to rent of the city.

THE reform movement, which had so auspicious a beginning some weeks ago, is attracting little of the public attention in New York City, because the chairman refuses to give out any statement as to what has been accomplished, or what it is proposed to accomplish. There are indications, however, that the work of investigation and securing of evidence to be used in the near future is being pushed quietly but vigorously. There is a feeling in the air that much permanent good will be accomplished by this movement, because it lacks the partisan bias which similar movements have had in the past.

THE "charter mill" is running full blast; at least fifty cities are endeavoring to better civic conditions in certain localities by purely legislative action. That is one step in the right direction, but only one. The most serious fault with charter making is, that a given code of civic law is not tried long enough to warrant such radical changes as are usually recommended after a short trial. A trifle more patience with the system, be it ever so bad, and more vigilant attention to the public servants would yield better results. The civic reformer, whether he proposes to patch the charter or mend the city official, would accomplish more if he were to remember the old adage: "Be sure you're right, and then go ahead."

IT is reported in the daily press that Assemblyman Bradley will introduce a bill in the New York Legislature which will call for a material reduction in the water rates of Buffalo. It would be more sensible if the legislator would introduce a bill requiring all the water consumers to use a meter. There is no city in the world that wastes so much water as Buffalo, and it has been demonstrated repeatedly that it is wasted particularly by the small consumer, who permits his water faucet to run all the time; in the winter to keep it from freezing and in the summer to keep it cool. There is only one city in the United States that has lower water rates, on the average, for the manufacturer and the small consumer, than Buffalo, and that city is Detroit. Buffalo needs water meters first; then it might be advisable to reduce the rates.

PERSONALITIES

—Jacob Phinizy is the new Mayor of Augusta, Ga.

—I. P. Delmas is the new Mayor of Scranton, Miss.

—The new Mayor of Oxford, Miss., is R. S. Adams.

—F. M. Weed is the new Mayor of Ocean Springs, Miss.

—Grant Graham is the new mayor of Piedmont, W. Va.

—Dr. John E. Toole is the new Mayor of Bainbridge, Ga.

—The new City Attorney of Atlanta, Ga., is W. H. Barrett.

—R. L. Moye was recently re-elected Mayor of Cuthbert, Ga.

—John B. Ansley is the new City Engineer of Americus, Ga.

—Philip S. North is the new City Treasurer of Atlanta, Ga.

—Nathan Emanuel has become the Mayor of Brunswick, Ga.

—M. M. George was recently re-elected Mayor of Lithonia, Ga.

—W. J. Outlaw is the newly elected Mayor of Pratt City, Ala.

—Dr. T. B. Bullard was recently elected Mayor of Palmetto, Ga.

—Nesbit Wingfield is the new Commissioner of Works of Atlanta, Ga.

—Mayor William C. Burgess is the new chief executive of Auburn, N. Y.

—Mayor C. W. Rich is the new chief executive of Hattiesburg, Miss.

—J. S. Patterson has been made the clerk of the Council of Atlanta, Ga.

—J. W. Strickland was elected Mayor at the recent election in Concord, Ga.

—David N. Cook has been re-elected Street Commissioner of Salem, Mass.

—C. J. Corcoran was elected City Clerk of Lawrence, Mass., on the ninety-eighth ballot.

—At the recent municipal election in Brooksville, Tenn., I. D. Borders was elected Mayor.

—Mayor Farley, of Cleveland, O., asserts that partisan politics is the bane of city government.

—John D. Merrill, of Cambridge, Mass., was recently elected president of the Common Council.

—Frank P. Schumacher is the newly appointed secretary of the Milwaukee, Wis., Park Board.

—Mayor A. W. Phillips, of Derby, Conn., assumed the duties of his office on the 7th of last month.

—Harvey Johnson, of Atlanta, Ga., has been elected president of the council for the ensuing year.

—Edgar B. Stewart was recently elected Mayor of Morgantown, W. Va., on the Republican ticket.

—Jackson, Miss., has selected William Hemmingway to act as its Mayor for the first term in the new century.

—Frederick P. Garrettson, the well-known club man and member of society, is the new Mayor of Newport, R. I.

—John L. Walters has been appointed treasurer of Charlottsville, Va., to fill the unexpired term of the late William Turner Jones.

—Patrick F. Brady, the new superintendent of streets, of Lowell, Mass., proposes to conduct the affairs of his office upon business principles.

—Street Commissioner Prior and Superintendent of Sewers Eddy, of Worcester, have been re-elected to their respective offices for another term.

—Daniel B. Lee, formerly assistant engineer of the Syracuse Water Works, has been appointed resident engineer in charge of construction at Middletown, N. Y.

—The Syracuse papers announce the resignation of Russell R. Stuart as City Engineer in order that he may go to Denver, Col., to engage in silver mining.

—Arthur E. Bostwick, for the last two years librarian of the Brooklyn Library, has accepted the position of superintendent of circulation in the New York Public Library.

—Mayor Thayer, of Norwich, Conn., among other things, in his annual message, calls the telephone service abominable, and declares in favor of a municipal gas plant.

—City Engineer W. E. Gunn, of Covington, Ky., reports many improvements during the past year, with the prospect of larger appropriations for the coming year.

—S. L. Smith is the president of the Council of Binghamton, N. Y.; C. P. Radeker, City Treasurer; S. E. Monroe, City Engineer; and Frank Stewart, Corporation Counsel.

—Bishop Henry C. Potter, of New York, urges the organization of a vigilant society large enough to cover all of Greater New York for the purpose of furthering the reform movement.

—Mayor Van Wyck, of New York city, claims that the large increase in the annual budget is due to the provisions of the charter and the mandatory acts of the Republican Legislature.

—Thomas McE. Vickers, formerly engineer of the Syracuse Bureau of Water, has resigned and accepted a position on the construction of the filter plant now under construction for Philadelphia.

—Mayor Thomas Taggart, of Indianapolis, is likely to become the next chairman of the National Democratic Committee. His friends announce that twenty-three members have already pledged him their votes.

—F. W. M. Heerwagen, formerly chairman of the Common Council, of Buffalo, is now acting City Controller, to fill the unexpired term of Erastus C. Knight, who has become Comptroller of the State.

—Major J. B. Collins, president of the Common Council of Jamestown, N. Y., writes that preparations are already being made for the reception of the delegates of the League of American Municipalities next August.

—Alderman I. C. Hull, of Binghamton, N. Y., recently resigned his office as alderman to accept that of City Clerk, to fill the vacancy made by the resignation of S. D. Kane, who had served efficiently for two years.

—Among other city officials recently elected in Savannah, Ga., William P. Bailey was made Clerk of the Council; C. S. Hardee, City Treasurer; William J. Winn, City Engineer; George M. Gadesden, Director of Public Works; William F. Brunner, Health Officer.

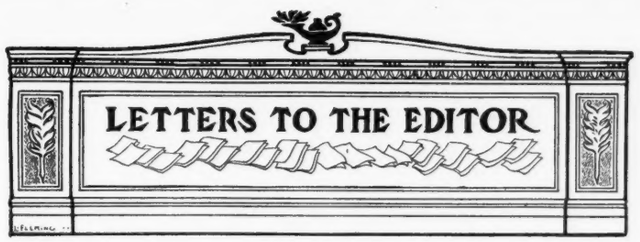
—The new officers of the Montana Society of Engineers are as follows: F. L. Sizer, president; Aug. Christian, first vice-president; George T. Wickes, second vice-president; Richard R. Vail, secretary and librarian; Joseph Harper, treasurer; Bertram H. Dunshee, trustee.

—E. S. Converse, of Malden, Mass., has given to that city $125,000 as an endowment fund for the Malden Public Library, which he and his wife gave the city as a memorial to their son, Frank E. Converse. This makes a total of $250,000 that Mr. and Mrs. Converse have given for the Malden Library.

—Mayor Worcester, of Dover, N. H., began the first administration of the city government in the new century on the first day of the new year. Among his chief assistants are: Charles W. Brown, City Clerk; John L. Copp, City Treasurer; Samuel D. Feiker, City Solicitor; George T. McDuffee, Street Commissioner.

—William R. Hill, Superintendent of the Aqueduct Commission, of New York city, recently addressed the engineering class of the Clarkson School of Technology, at Potsdam, N. Y. After reviewing ancient water systems Mr. Hill described the principal features of the Syracuse Water Works, of which he was superintendent for several years.

—At the recent annual meeting of the Connecticut Civil Engineers' and Surveyors' Association, in Hartford, the following officers were elected: H. J. Kellogg, of New Haven, President; C. B. Vorce, of Hartford, first vice-president; Arthur J. Patton, of Waterbury, second vice-president; George K. Crandall, of New London, secretary and treasurer; and John K. Punderford, of New Haven, assistant secretary.



STEAM FROM GARBAGE DESTRUCTORS?

————, Pa., Jan. 31, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Will you kindly give me the address of some one who builds garbage plants, where the garbage itself furnishes the fuel and creates steam? Also advise me where there are any in operation.

D. GEORGE SHRYOCK.

There is no garbage plant in this country that utilizes the heat from the garbage, but there are several in England. We expect to have a full description of one of the English plants now in operation in our March issue.—[EDITOR M. J. & E.

PUBLIC VS. PRIVATE OWNERSHIP.

————, Wis., Jan. 4, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

From your knowledge of present conditions in American municipalities, do you think it would be best to have each municipality own and operate the plants for all local industries that tend to become monopolies? EDW. J. DEMPSEY.

We would be glad to have the readers of the MUNICIPAL JOURNAL AND ENGINEER answer this question. Limit your answers to 100 words and we will print them all, unless they come in too great numbers. What have the friends or opponents of public ownership to say upon the question?—[EDITOR of M. J. & E.

IS A CITY ASPHALT PLANT PROFITABLE?

————, N. Y., Feb. 2, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

For some time it has seemed to me that it would be better for our city to do the necessary repairing to its asphalt pavements than to have the work done by contract. Before purchasing the necessary tools, I would like to know the results in cities which own an asphalt repairing plant.

We now have about 85,000 square yards of sheet asphalt pavement in the city, and although the larger part of it is under the guarantee of ten years required by the specifications under which the pavements were laid, still there is a sufficient quantity which it is necessary for the city to repair, to make a plant owned by the city pay. There is only one asphalt paving company in this city, and it does not pay it to get the necessary men and start up its plant to repair a small number of square yards of pavement, whereas the city could employ the men in some other way when they were not making repairs to the asphalt pavements. A defect in an asphalt pavement increases in size very rapidly, unless it is attended to at once. In this city it has been the practice to wait until a considerable number of square yards needed repairing before beginning work. If a plant were owned by the city, the defect could be attended to as soon as discovered, and hence a smaller amount of repairing would be done each year and a saving thereby affected.

By neglecting the defective place for some time, it may become dangerous, and an accident might result, which would make the city liable for heavy damages.

The local asphalt company has been very reasonable in its charge for repair work, but the city ought to be able to do the work full as cheaply, and doing it immediately would make it more economical and would decrease the liability of an accident due to a pavement being in a defective condition for some time.

I would like to learn from the officials of cities which have a portable asphalt plant what tools they have purchased, the cost of the plant, how much trouble they have had in obtaining materials, and if they have made any saving in making their own repairs.

E. R. CARY, *City Engineer.*

WANTS TO KNOW ABOUT MUNICIPAL LIGHTING.

————, Wis, Jan. 9, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

I am desirous of securing some information regarding municipal ownership of electric light plants. Do you know of any publication on this subject; if so, will you please give me the address of the publication or pamphlet, or put me in correspondence with anyone familiar with this subject? A. B. IDESON.

A subscription to the MUNICIPAL JOURNAL AND ENGINEER; "Municipal Monopolies," by Prof. Edward W. Bemis, price $2, postage paid; the December, 1897, issue of *Municipal Affairs*, and that of September, 1900, contain several articles upon this subject. Price, 25 cents each. Any or all of these can be ordered through the MUNICIPAL JOURNAL AND ENGINEER.—[EDITOR of M. J. & E.

SIDEWALKS LAID BY THE CITY.

PENSACOLA, Fla., Jan. 29, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Replying to your favor of the 24th instant, asking about our plan for laying sidewalks at the public expense, I only offered the suggestion that the city take up that work. The daily papers considered it a good idea and pushed it along.

The plan is to have the small property owners form themselves into a league for public improvements and ask the Legislature to pass an act, granting the city power to lay sidewalks, each member of the league to pledge himself to work for and support what the majority decides upon in a meeting called for that purpose.

By the city's assuming the liability for the cost of constructions arrangements could be made whereby it would permit the small property owner to pay for the improvement in installments, which could be added to the taxes of each individual until the whole amount was paid. This plan would make such improvements possible to the small taxpayer and would not make it a burden to anyone.

The plan has not yet been adopted, but there are a few names on the list, and it is hoped that enough will be secured to carry the project through to a finish.

L. J. ANDERSON, *Deputy Marshal.*

This is a subject that interests many Canadian cities and not a few in the United States. We would be glad to receive suggestions from others; or, better still, the description of some plan already in operation.—[EDITOR M. J. & E.

VAGRANTS MADE TO WORK.

Mobile, Ala., Jan. 28, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Your favor of the 24th is at hand. Under the charter of the City of Mobile, the General Council passed an ordinance many years ago, which provides that any one of the vagrant class may be taken up by the police and docketed for trial. Such persons are arrested under the general charge of being "dangerous and suspicious," and unless they are able to furnish satisfactory account of themselves, the police usually give them a few hours to leave the city or put them to work with the city prisoners. We believe that the scheme, as worked in Mobile, is well known to the tramp fraternity throughout the country. Our police force is very vigilant in this respect. The charge of "D. and S." (dangerous and suspicious) is not as common on the police docket as formerly, and the practice which has been practiced for some years of keeping a record of these characters, in putting them to hard work in case they are arrested the second time, has kept them away from our city.

At one time there was some talk of testing the constitutionality of this ordinance under the charter, but in that particular case nothing was finally done, and in the general class of cases, the man arrested as a "D. and S." is glad enough to take advantage of the punishment to leave town, and does not stop to test the constitutional question of the city authorities. On the whole, our ordinance is, we think, a good one, and serves the purpose.

T. S. FRY, *Mayor.*

PAINT WHICH PREVENTS RUST OR CORROSION.

————————, S. C., Jan. 15, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Perhaps you can inform me where I can secure a paint that will prevent the corrosion of a portion of our water mains, which are exposed to the action of moisture and certain acids, the principal acid being carbonic. I have tried all the paints that are on the market, but have found nothing that exactly meets our conditions, for all have failed. I have tried "iron oxide paint," "red lead and linseed oil," "varnishes with asphalt as a base," and all the carbon paints that I know about with varying success, but none fill the bill. If you can help me out I shall be greatly obliged.

A PERPLEXED WATER SUPERINTENDENT.

On referring this inquiry to one of our staff we found that some recent experiments had discovered just the remedy that will fit the case mentioned above. For the want of a better name it has been called "Crysolite." It belongs to the carbon class of paints, and is really a pure carbon paint.

In the tests thus far given it seems to possess all the requisites necessary to prevent the rusting of iron and steel surfaces. It forms a perfectly uniform coating, non-porous, and impervious to moisture, air and carbonic acid gas; it is lasting and durable, and does not deteriorate with age; and it has not been materially affected by change of temperature.

While the paint has been put to every known test, it may be said to be still in the experimental stage and it has not yet been placed on the market. But if any one wishes to try it, he can learn how to secure a sample by addressing this magazine.—[Editor of M. J. & E.

WANTS ESTIMATED COST OF LIGHT PLANT.

————————, N. Y., Jan. 19, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Our village is talking of putting in an electric light plant and I would like to have you answer the following questions:

1. What is the average or fair charge per light to a village of about 5,000 population, for a 1,200 candle power arc light, running all night and every night? (Ours cost us, at present, from a private company, a little over $75 per light.)

2. Give me a brief statement of machinery necessary (and cost thereof), for a duplicate system electric light plant. Include cost per mile for line of lamps, say for about 100 or 125 lamps, of 2000 candle power. Let this estimate include two engines, two boilers, etc.

3. Give me your opinion as to the basis for placing a valuation on the water plant already in operation and owned by a private company, in case we appoint appraisers, as our contract provides, in the event the village purchases the plant.

1. The price charged by the local company is not excessive, in comparison with charges in other small towns. If the company is using the open arc, the price gives them only a fair profit. Competition might compel the company to use the enclosed arc, which might secure a rate of from $55 to $60, but it is seldom advisable to invite competition because of certain other disadvantages which would be sure to accrue to a second system of lighting; especially where the charge is not excessive. Competition in such a small town is very improbable, and the only way to secure a lower price would be by the installation of a municipal plant, which would not be advisable unless it could be run on business principles and absolutely free from the control of politics.

2. The installation of an electric lighting system having a capacity of 100 to 125 full arcs, using 35-foot chestnut poles, allowing from thirty-five to thirty-eight poles to the mile; a power equipment in duplicate; a one-story building, 25 x 60 feet, cost not to exceed $3,000, can be completed for a sum not to exceed $240 per lamp. The foregoing estimate provides for two 100 horse power return tubular boilers and stokers; two 100 horse power compound engines; two 125 light 6.6 ampere arc dynamos, belt driven, and direct current enclosed arc lamps. The operating expenses should not exceed $35 per lamp per annum, if coal can be procured at $1 per ton, exclusive of freight charges.

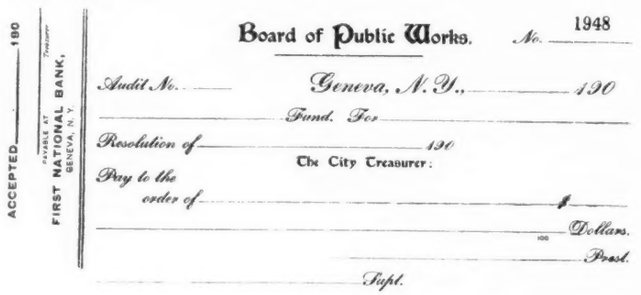
3. The appraisers should take into consideration, (1) The cost of construction; (2) The earning capacity; (3) What it would cost to duplicate the system; (4) The value of the source of supply; that is, whether the present company owns the only available source, etc.—[EDITOR of M. J. & E.

COLOR SCHEME AND ASPHALT GUARANTEE.

GENEVA, N. Y., Jan. 27, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

I notice an article in your valuable publication, of the December issue, describing the city warrants issued by Treasurer Sours, of Denver, Colorado, which, for the purpose of rapid sorting, are printed in different colors, each color representing a different department. This plan has been in operation in this city for three years, under the direction of Treasurer Flynn. Mr. Flynn's plan, however, has one advantage over the Denver scheme. It is that a different colored paper is used for each department warrant instead of a different colored ink in printing the warrant. A glance at any number of warrants will thus show without looking at the face to which department the warrant belongs.


ACCEPTED ——— 190
PAYABLE AT FIRST NATIONAL BANK, GENEVA, N. Y.
Treasurer
Board of Public Works. No. 1948
Audit No. ——— Geneva, N. Y., ——— 190
——— Fund. For ———
Resolution of ——— 190
The City Treasurer:
Pay to the order of ———
——— Dollars.
100
——— Prest.
——— Supt.

I enclose you a sample of the Board of Public Works warrant, the stationery for which is light blue throughout. It will be noted that the warrant of the Department of Public Works becomes accepted by the treasurer, and is made payable at the bank, and in this way the warrants also become the treasurer's vouchers, the check and warrant thus being one document. I enclose, also, blank accounts of highway, water and sewer departments, showing how the various items are distributed. These accounts or bills are approved by the Board of Audit, and, in case of labor, additionally by the Civil Service Board.

I notice, also, an article relating to asphalt pavement guarantee; one prepared by City Engineer Fisher, of Rochester, which contains some very excellent suggestions. We enclose herewith a copy of our asphalt guarantee, which we are told has some points in advantage also. The guarantee is for fifteen years, and the contractor bids independently from the installation price. The price bid for the last work for guarantee was 60 cents per yard, for fifteen years for all maintenance and repairs occasioned through disintegration or otherwise. A separate price is also bid for trench work for laying or relaying pipes in the street by the city or property owners during the period of the guarantee. This 60 cents, or 4 cents per yard per annum, is paid in equal annual installments for fifteen years. An additional 10 cents per yard is also retained during the period of fifteen years, and a bond of 25 per cent. of the total contract price is required additionally. It will be noted that the city has not to depend absolutely on the bond and the contract of the company for replacement of pavement that "goes out," but the city has during this time a considerable amount of money on hand with which it can make these repairs, if the contractor fails to do so.

I desire to compliment you on the general excellence of your publication. It contains an immense amount of interesting matter and should be in the hands of every city official.

F. A. MALETTE.

The blanks used in the highway, water and sewer departments referred to in the above, contain several good suggestions that will be valuable to other municipalities. Undoubtedly Mr. Malette will be pleased to send duplicates to such as may desire to examine them.—[EDITOR of M. J. & E.

CURRENT TOPICS

CHICAGO is planning to build an art museum 200 feet high, which will cost $2,500,000.

* * *

IT is quite likely that the work upon the tunnel from New York to Brooklyn will be started within a year.

* * *

THE city of Lowell, Mass., proposes to celebrate its seventy-fifth anniversary as a corporation in the near future.

* * *

THE Common Council of Worcester, Mass., has decreed that the city should pay at the rate of $2 per day for common labor.

* * *

THE city of Binghamton, N. Y., has decided to give the voting machine a trial, and will use the Bardwell Votometer machine at a special election on February 19.

* * *

THE New York Central Railroad has informed the city of Syracuse that, so far as it is concerned, it is ready to abolish all grade crossings within the limits of that city.

* * *

THE civil service system of San Francisco is now undergoing a more or less sensational investigation by one of the local papers. The paper thinks it is making out a good case.

* * *

THERE is some talk in Worcester, Mass., of using the voting machine to settle the disputes between the mayoralty candidates. They received a tie vote, and another election has been called for.

* * *

IT is reported that the city of Everett, Wash., will make a determined effort to secure the removal of the State capital to that city. A committee is authorized to offer a free site and $100,000 in cash.

* * *

AN important conference among the aldermen of the cities of the second class of New York State will be held in Albany some time this month, and the Mayors and corporation counsels will meet in Syracuse.

* * *

PITTSBURG, Pa., is considering some large ideas which call for the extensive improvement of the river front. If the scheme is carried out it will be patterned after a foreign plan, that has been successful in a German city.

* * *

A MUNICIPAL ownership league has entered the St. Louis municipal campaign. It claims that 12,000 votes are behind it, which are pledged to support no candidate not in favor of the public ownership of the street railways and lighting plant.

* * *

THE city of St. Louis, now that it has evidence to show that it already has secured $10,000,000 toward its World's Fair for 1903, proposes to ask Congress to appropriate $5,000,000 toward the undertaking, in accordance with the agreement.

* * *

STREET COMMISSIONER NAGLE, of New York City, is perplexed over the garbage question. According to recent advices which have come into his possession, it is shown that crematories may be illegal as a method of disposing of the garbage of New York.

* * *

CONNECTICUT and New Jersey have made for themselves good records in road building, and now the Keystone State proposes to join them. The highway commission of that State has recommended the expenditure of $1,000,000 upon the roads of the State during the coming year.

IT is shown by the last census that a much larger representation in Congress comes from the cities at the present time than were sent ten years ago. A count of the representatives shows that the increase from cities on the Republican side of the House is larger than that on the Democratic side.

* * *

"WE are getting bosses that the bosses are afraid of," said Controller Coler, of New York, at a recent public dinner. "They are the employees of the city government. They become organized and then go to Albany and enforce the enactment of bills, and the city is compelled to pay them. The time is coming when we will have to fight the employees and not the party leaders."

* * *

RECENTLY an expose was made by one of the New York papers of the expensive methods and practices of the present administration. A day or so after another New York paper, of the independent order, came out in a long article showing that the increased size of the budget for the city was quite as much due to Republican legislation at Albany as to Democratic administration in New York.

MUNICIPAL OWNERSHIP.

The Knights of Labor of Brooklyn have declared in favor of a municipal asphalting plant.

* * *

Bridgeport, Conn., it is reported, proposes to construct and operate its own electric light plant.

* * *

Richmond, Ind., is having some difficulty in launching its schemes to construct and operate a municipal electric light plant.

* * *

Mayor Kilduff, of Waterbury, Conn., is greatly in favor of the municipal ownership and operation of electric light plants.

* * *

Many of the citizens of North Plainfield, N. J., are reported to be much in favor of city ownership of the water and electric light plants.

* * *

The new charter for Lincoln, Neb., provides for the ownership and operation of the electric light plant which shall furnish the city with light.

* * *

Mayor Coulter, of Brockton, Mass., strongly favors municipal ownership of all public utilities in his annual message to the Common Council.

* * *

Toronto, Ont., recently voted, by an overwhelming majority, in favor of the city buying the plant of the gas company which now supplies the city with gas.

* * *

The Common Council of Boston has ordered an investigation of the gas and electric light companies of that city, with a view to their purchase and operation by the city.

* * *

At the recent election in Belington, W. Va., the taxpayers voted to erect and operate its own electric light plant. The proposition was carried by a majority of forty-eight votes.

* * *

The city of Jackson, Tenn., it is reported, has decided to put in its own electric light plant, and is now at work upon plans and specifications. Bids will soon be advertised for.

* * *

The village of Bath, N. Y., under the leadership of the Hon. Thomas Shannon, president, is debating the feasibility of owning and operating its own water and electric light plants.

* * *

Assemblyman Calvin D. Van Name, of Staten Island, has introduced a bill in the New York Legislature calling for the ownership and operation by the city of New York of all the ferries.

The Federation of Labor of Sedalia, Mo., has sent a communication to the City Council recommending the acquirement of all street railway facilities, in order that the street railways may be owned and operated by the city.

* * *

Kokomo, Ind., has a project under way to own its own water system. Contracts have been obtained, it is said, from enough consumers to guarantee $12,000 a year, and the city will have a water works' fund of $50,000 available in a few months.

* * *

Assemblyman Williams, of New Jersey, has asked for the appointment of a commission to inquire into the advisability of the State becoming the owner of all potable water, and undertaking the task of distribution, together with such filtration or other purification as may be necessary.

* * *

At a special election in Tarrytown, N. Y., the citizens voted against a proposition to own and operate its own electric light plant. Others are not satisfied with the decision at the polls and propose to raise sufficient capital to carry the project through, so that the city will reap the benefit anyway.

* * *

From Hudson County, New Jersey, comes the report that the authorities are about to shut down the gas plant that has, for several years, furnished light to some of the institutions at the rate of $2.50 per thousand cubic feet, when the same amount could be purchased from a private company at half that price.

WHAT ENGLISH CITIES ARE DOING.

HALIFAX wants to borrow £23,000 for gas purposes.

NEWARK expects to expend £20,000 on its water works.

STAFFORD expects to expend £10,000 for electric lighting purposes.

DARWEN wants to borrow £13,000 to improve its electric lighting plant.

BRIGHTON expects to improve its tramway system to the amount of £13,200.

SUNDERLAND will soon expend £17,086 for the construction of a new street.

MANCHESTER wants to borrow £12,000 for a new park and recreation ground.

HOVE has just received authority to borrow £8,760 for works of wood paving.

BIRMINGHAM will soon commence the construction of a bridge costing £50,000.

CHRISTCHURCH has adopted a scheme for a sewer system and a sewage disposal plant.

TAUNTON will soon erect at the sewage works a Horsefall patent refuse destructor plant.

CHELSEA recently voted, by 4,484 to 2,627, to construct, operate and maintain its own tramway system.

LINCOLN is reported to favor the acquisition of the local tramways and to adopt the electric traction.

ALDERSHOT ratepayers have expressed their approval of a proposition to purchase the gas and waterworks.

AYR has applied for the sanction of the Local Government Board to borrow £25,000 for tramway purposes.

LEEDS is contemplating an improvement to its water works that will involve the expenditure of £2,000,000.

MANCHESTER proposes to apply to the Local Government Board for authority to borrow £500,000 for electricity purposes.

COLCHESTER will seek authority from the Local Government Board to borrow £12,000 for the extension of its electric lighting.

HEYWOOD has applied to the Local Government Board for authority to borrow £25,100 for extensive improvements on its sewerage system.

RIPON proposes to erect its own electric lighting plant, and establish a system of lighting, the total cost of which will amount to £15,000.

CARLISLE and CHORLEY propose to erect carburetted water gas plants at their gas works for the purpose of enriching their coal gas without using cannel.

LIVERPOOL has commenced work upon its new storage reservoir, which will have a capacity of 110,000,000 gallons. The reservoir will cover more than thirty-four acres of land, the top-water area being twenty-eight acres.

KINGSTON-UPON-THAMES voted, at a recent special election, to permit a private corporation to construct its tramway system, instead of by the municipality. The majority in favor of the private company was 2,578 on a total vote of 4,824.

BLACKBURN gives some interesting figures showing the success attending the municipalization and the introduction of cheap fares on the Blackburn tramways. Two years ago the corporation adopted the electric system and reduced fares 100 per cent. The receipts that year were over £4,000 more than in the previous year, representing an increase of 2,000,000 passengers. Last year's results were also satisfactory, the increase over 1899 being £2,500 in receipts and 600,000 in passengers.

CONVENTION DATES.

FEBRUARY.

Chief of Police State Convention of Illinois, will meet in Chicago on February 20-21, 1901.

State Gas Association of Michigan will meet in Grand Rapids some time during the month. Paul Doty, secretary, Grand Rapids, Mich.

The Eastern New York Horticultural Society, of New York, will meet in New York City on February 13 and 14, 1901. Dr. F. M. Hexamen, 51 Lafayette Place, New York City, secretary.

Reunion Old Volunteer Fireman's Life Association will meet in Cincinnati, O., on February 22, 1901.

The National Brick Manufacturers' Association will meet in Old Point Comfort, Va., February 11-16. Theodore A. Randall, 2124 Collegeve street, Indianapolis, Ind.

The State Library Association of Wisconsin will meet in Eau Claire, Wis., on February 22, 1901. B. M. Brown, secretary, Eau Claire, Wis.

MARCH.

State Horticultural Flower Show, of Pennsylvania, takes place in Philadelphia, March 19-22. David Rust, secretary, Horticultural Hall, Philadelphia, Pa.

The Automobile Show will be held in Chicago, Ill., on March 23-30, 1901.

Charities and Corrections State Conference, of Iowa, will meet in Red Oaks, Ia., in March. Charlotta Goff, secretary, 607 Locust street, Des Moines, Ia.

APRIL.

The Volunteer Firemen's Association, of Alabama, will meet in Mobile, Ala., on April 9, 1901. J. H. Turner, secretary, Mobile.

The American Social Science Association will meet in Washington, D. C., some time during the month.

MAY.

The Municipal League of Ohio will meet in Cleveland, O., on May 14-16. Dr. S. O. Giffin, secretary, Columbus, O.

National Conference of Charities and Corrections will take place in Washington, D. C., in May. H. H. Hart, Unity Building, Chicago, Ill.

JUNE.

The National Social and Political Conference will take place in Detroit, Mich., June 28-July 2, 1901. D. J. Meserole, secretary, 160 Joralemon street, Brooklyn, N. Y.

JULY.

The American Library Association will meet in Waukesha, Wis., on July 3, 1901.

The Trans-Mississippi Congress will meet in Cripple Creek, Colo., on July 17-21.

AUGUST.

American Florists' and Ornamental Horticulturists' Association will meet in Buffalo, N. Y., on August 20-24, 1901. William J. Stewart, secretary, 67 Broomfield street, Boston, Mass.

WHAT THE CITIES ARE DOING.

THE city of Lead, S. D., has recently completed a sanitary sewer system, costing $45,000.

* * *

THE city of Gloucester, Mass., contemplates an extensive improvement of its water system.

* * *

THE city of Bridgeport, Conn., is considering a plan to make a $30,000 addition to the City Hall.

* * *

IT is proposed to appropriate the $20,000 toward the establishment of municipal lodging houses in Chicago.

* * *

MAYOR CHAPIN, of Holyoke, Mass., recommends the erection of more bath houses during the coming year.

* * *

THE villages of Oswego Falls and Fulton, N. Y., have decided to unite and form a new city. The aggregate population is about 10,000.

* * *

DETROIT, Mich., is having some trouble in making a new garbage contract, and, therefore, it may be compelled to put in a municipal plant.

* * *

THE city of Warsaw, Ind., has awarded the contract for the construction of three lateral sewers, which is the last portion of a sewer system costing $65,000.

* * *

A PLAN is on foot to consolidate Hoboken and North Hudson, N. J. This takes the place of the proposition to unite all the municipalities in Hudson county.

* * *

NEWCASTLE, Pa., citizens have about concluded to go into municipal ownership on a large scale. The ownership of the electric light and water works plants is contemplated.

* * *

THERE have been so many accidents in Pittsburg from indiscriminate sledding on some of the streets that it is proposed to provide a coasting track for the boys and girls at the city's expense.

* * *

HEREAFTER it is proposed by the city of Chicago to purchase the cloth for uniforms for the firemen and policemen to wear. It is claimed this plan will effect a saving of from 15 to 25 per cent.

* * *

WIRE Inspector McElholm, of Lowell, Mass., has made a proposition to the city authorities which doubtless will result in a bill being introduced in the Legislature requiring all wires within the city limits to be put underground.

* * *

THE City Council of Chicago has passed the anti-sign board ordinance, and has ordered the removal of all uncouth advertising signs of large size within a short distance of any park, boulevard, public place or public building.

* * *

LAST year some of the good citizens of Buffalo, N. Y., started a movement which would provide a playground for the children. The movement has met with such hearty approval that other playgrounds will be thrown open to the children in the near future.

* * *

AT last the proposed independent fire main for Philadelphia, which will be located in the most congested district, is assured, as the contract for its construction has just been awarded, the contract price amounting to $315,816. It is hoped that the work will be finished in about six months.

* * *

THE Board of Public Works of Grand Rapids, Mich., after a thorough canvass of the subject, has decided to put in meters for all domestic consumers of the city's water supply, and to charge the expense of setting the meter to the city. It is firmly believed by the authorities that this action will result in a real saving to the city, although a large sum of money will be immediately expended for meters.

* * *

THE City Council of St. Louis has passed a bill authorizing the sale of a portion of its fire department property for not less than $100,000, in order that a new, modern and adequate headquarters' building may be constructed in a more desirable location than is now occupied by the fire headquarters. Fifty thousand dollars will be paid for a new site.

MUNICIPAL CONDITIONS IN COPENHAGEN.

LAST December the Hon. J. A. Johnson, mayor of Fargo, N. D., and president of the League of American Municipalities, started on a special mission to Norway and Sweden. Before his departure he promised to give his impressions of conditions in foreign municipalities for the benefit of the readers of the MUNICIPAL JOURNAL AND ENGINEER. His first letter deals with Copenhagen, Denmark, about which he writes:

"This is one of the oldest and most interesting of European cities. Its history dates back to 1167. It has repeatedly been ravished by fire and war, but its prosperity in the last fifty years has been phenomenal. In 1850 it had a population of about 30,000; now it claims 413,000. It has many fine public buildings and private residences. Its schools, colleges and universities are as good as can be found anywhere, and its people are enterprising and up-to-date in every way.

"The city has four Mayors, the executive authority being combined in the four, but each is at the head of a department over which he has practically complete control.

"The streets are paved mostly with granite, but it is the smoothest and best laid granite I ever saw. A few streets have asphalt paving. The majority of the streets are narrow; too much so for the present needs of traffic. People have to walk between the curbs among the vehicles, some of the sidewalks not being wide enough for the accommodation of the pedestrians.

"All of the streets are kept very clean by hand labor.

"The city is well supplied with street cars; some run by horses and others by electricity. The authorities are installing electric street cars as fast as they can.

"One thing it lacks—a good sewerage system. The sewers now empty into the harbor, but that will be remedied in the near future. Plans are now under way which will require the construction of large intercepting sewers. These will be run under the harbor to a nearby island, from which point it will be pumped into the sound. When this plan is carried out the city will have one of the best sewer systems in Europe.

"Taxes are levied in much the same manner as in the municipalities of the United States, but there is an additional tax on the income of individuals which exceeds $168."

LARGE SALARIES PAID IN PITTSBURG.

IN connection with the investigation being made in the matter of securing a new charter for Pittsburg, Pa., some interesting facts relative to city and county finances are brought out. The mayor's office requires annually $11,000 for salaries; engineering and surveys, $60,000; highways and sewers, $25,000; water supply and distribution, $10,500; board of viewers, $13,000; parks, $32,000; bureau of city property, $28,000.

This money is all used to pay elected or appointed officers. Laborers who repair the streets receive $225,000 annually, and at the Brilliant pumping station $40,000 is paid out for labor. The bureau of water assessments expends $11,000; the bureau of bridges, for salaries, watchmen and labor, $21,000. In the department of public safety over $900,000 a

year is paid out. The average salaries in this department for all officials, including messengers, window cleaners, scrub women and janitors, is about $1,000 a year. The bureau of electricity divides $24,049.53 among twenty-one employees, while sixty-two men in the bureau of health receive nearly $60,000. The bureau of building inspection costs the taxpayers $11,166 for eight employees. The bureau of fire disburses $350,000; bureau of police, 450,000.

At the court house, without counting the judges of the various courts, fees and other incidental expenses, the payroll foots up about $500,000. The sheriff gets $8,000, his clerks and deputies $32,000 more. The prothonotary and his assistants get $37,000. The payroll of the clerk of court foots up $17,000, and that of the recorder's office exceeds $40,000. The register and clerks get about $17,000. In the office of the district attorney $20,000 is disbursed, and the coroner's payroll is also $20,000. The three county commissioners and their clerks draw over $56,000. The county controller receives large fees and his clerks collect $13,000 additional. The treasurer's office costs $37,000. In the orphan's court the clerks draw $9,300, and the court criers and tipstaffs receive over $27,000. Persons employed to keep the big court house in good order are paid $40,000. The interpreters and stenographers draw $12,000, and the jail warden's payroll amounts to $15,000. In addition to these expenditures is about $70,000 for assessment of taxes and about $50,000 for a general election, and about $60,000 for advertising and printing.

CHICAGO STREET RAILWAY COMMISSION.

THE Street Railway Commission of Chicago has been at work for a year, endeavoring to find a solution of the problem which confronts that city. Its report, recently submitted, is a model in every particular. It is conservative in tone and judicial in its conclusions, striking the golden mean between the extreme corporation and the public ownership views, when dealing with that phase of the question.

In a great measure, the style and substance of the report has been shaped by the secretary, Mr. George S. Sikes, who left the editorial staff of the *Record* to accept his present position. Mr. Sikes has made a special study of municipal affairs for several years and is, therefore, especially fitted to perform the difficult work on this commission. While in New York the other day, Mr. Sikes was seen by a representative of the MUNICIPAL JOURNAL AND ENGINEER. In referring to the work of the commission, he said:

"The principal purpose of my visit to New York is to make a study of the sub-ways now under construction in this city for the benefit of the Street Railway Commission of Chicago. From here I go to Boston to study the sub-ways in operation there.

"We think we need a sub-way system in Chicago. In the main, Chicago will follow the Boston plan rather than the New York plan: that is, we will have sub-ways in the heart of the city for the accommodation of the street cars entering that district, thus making possible the removal of cars from the street surfaces within the most congested area. There is as yet no talk in Chicago of an independent underground system such as is under construction in New York. The Illinois Legislature is now in session and the desire is to secure from that Legislature the grant of authority necessary to enable the City Council of Chicago to deal with the situation in such a manner as may be deemed wise. After that, it is to be hoped engineers will be appointed to make a detailed study of the entire matter.

"My object on this trip is to gather information that may be of use to the commission in framing the bill which the Legislature will be asked to pass.

"The Street Railway Commission, of which I am secretary, has been in existence now for something over a year. It consists of seven aldermen appointed by Mayor Harrison under authority of a Council resolution. The principal street railway franchises in Chicago begin to expire July 30, 1903. The commission was created to make a study of the entire transportation question and to recommend a policy for the guidance of the city in dealing with the situation. A report dealing with various questions of policy and containing a draft of a street railway bill which the Legislature is asked to pass, was submitted to and passed by the City Council in December last. In its nature the bill is in the main enabling legislation. It is for the most part a mere grant of power under restrictions and safeguards to the City Council to deal with the entire situation. Among other things, the bill authorizes cities to own and operate street railways. It is not the expectation or desire of the commission that this power will be exercised at once. In fact, the commission would consider municipal operation in the immediate future an unwise policy for Chicago, although it does favor at the earliest practical time ownership of the tracks and of whatever may form a part of the street; but the commission does hold that cities ought to have the power to own and operate, to be exercised in case of need. The possession of this power would be of great value to cities in their negotiations with private corporations.

"A feature of the bill in connection with municipal ownership is that it provides that bonds issued for the purpose of acquiring or constructing street railways shall be a lien only on revenues and property, and not an obligation of the city possibly chargeable to the tax payers. This provision was due in part to the special necessities of Chicago. The city has reached its limit of indebtedness under the constitution, and the only hope of municipal ownership is through some such method of financing. But apart from the special necessities of the constitution, the Chicago commission is of the opinion that the plan outlined in this respect would be a wise one to adopt."

STREET FAIRS AS AN ADVERTISING MEDIUM.

BY HON. W. C. LEITSCH, MAYOR OF COLUMBUS, IND.

CITIES dependent, to any great extent, upon farming communities for their existence must, in these days of fierce competition, be ever alert that their radius of trade is not reduced. They must not only offer better advantages for trading, but also extend to their patrons opportunities for entertainment superior to those offered by surrounding cities. There must be encouraged a preference which will hold not only the regular trade, but gain additions from the younger element, and draw on more distant territory.

One of the best methods of entertaining visitors and, at the same time, affording splendid opportunities to merchants

for displaying and advertising their wares is a "street fair." The great advantage of these fairs over country fairs is that visitors are kept in the business district throughout the day, and by arranging the performances so that opportunities are offered for inspecting and buying merchandise, more good is realized than from any other mode of advertising, and it is the general consensus of opinion among merchants in this city that no entertainment ever before offered has resulted in as much good, directly and indirectly, as these fairs.

I know that many persons condemn this mode of entertainment, and claim that street fairs are managed mostly in the interest of the liquor element, and offer opportunities to the vicious, immoral, and sporting fraternity to ply their vocation, but the degree of liberty accorded to this class depends entirely upon the management of the fair and the city authorities.

Columbus has held a street fair annually since 1898, and there have been some things to criticise. This will always be found true of any entertainment offered to the public where it is necessary to cater to all kinds of people and tastes. The management here has never permitted gambling of any kind, and this rule has resulted in excluding the thieving and the criminal element, as the class following gaming devices, known as "cappers," are mostly sneak thieves and pick pockets, who ply their trade on the unwary when they are not assisting in fleecing those with speculative tendencies.

Our licenses for side shows have always contained a provision that if there were any objectionable features in the performance it could be stopped immediately, and our amusement committee being wide awake, firm, and discriminating, there has been but little to complain of in that direction. The mere fact that there may have been at some street fairs a super-abundance of undesirable features is no reason why this method of entertainment should be generally condemned as one of unrestrained license.

Our fairs have been of three days' duration, and until this year the county fair plan of offering prizes on all kinds of farm products and stock was followed. These products were arranged and displayed in booths that were erected in front of the different business houses; these booths were from ten to twelve feet to thirty by twelve feet in size, and were artistically constructed.

This year, however, the displays were of merchandise shown by business houses of the city, and no prizes were offered. The programme begins about ten o'clock in the morning and continues until nine o'clock at night. The vaudeville and other performances take place on the business streets, and are free to all. Our effort is to offer a good, jolly, rollicking day's sport; and it is our endeavor to present only the best and cleanest vaudeville performances, given by artists of standing in the theatrical world. If amusements are confined to the legitimate there can be no reason advanced against this, the most popular of recent innovations, combining business and pleasure.

—Of the cities having a population of 30,000 and over, Joliet, Ill., has the largest tax rate, $91.00 per $1,000, which includes State, county, city and other taxes.

THE RIGHT AND THE WRONG OF IT.

By Thos. C. Harris, C. E., Baltimore.

The diagram (Fig. 1) shows a carriage or wagon way across the sidewalk, into a gate or building. This style of crossing is often seen, and is abominable everywhere. Pedestrians who use the walk are obliged to step down, and

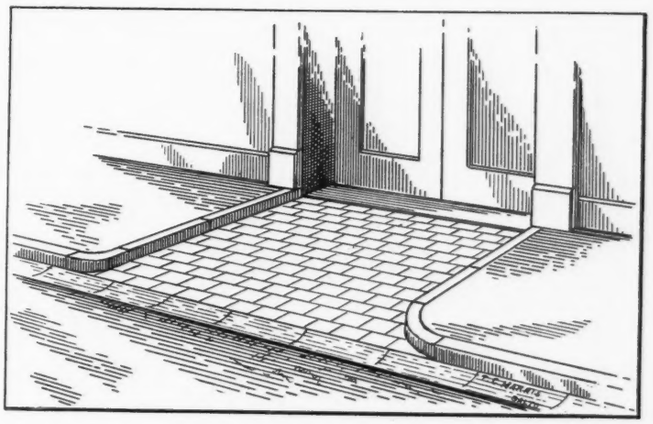


FIG. 1.—THE WRONG WAY.

then up again, from four to eight inches, in order to pass. The unwary may stumble or receive a painful jolt on stepping down the unseen depression. Baby carriages must be lifted over by main strength. Such crossings should not be allowed, and the diagram is intended to serve as an illustration of how not to do it.

Fig. 2 shows a similar situation, where the construction is not only much better, but cheaper also. If the location is

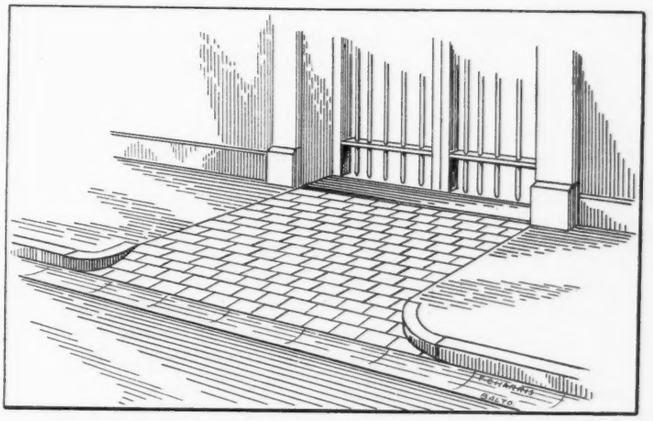


FIG. 2.—THE RIGHT WAY.

such as to make surface drainage necessary, the paving may be laid with a gentle dip toward the center, and so lead the water into the gutter. One can walk over such a crossing and not be conscious of any difference in the sidewalk. Both styles of crossing are common in Baltimore, and perhaps in other cities.

—New York City was incorporated in 1614.

—Chicago and Toledo were incorporated in the same year—1837. The former has a population of 1,698,575 and the latter 131,822.

FIRE DEPARTMENT

—Rev. Charles T. Walkley has been appointed honorary chaplain of the New York Fire Department by Chief Croker.

—An effort was made a short time ago to reduce the pay of the members of the New Orleans fire department, but the short-sighted economy failed, and the salaries will remain the same as last year.

—The citizens of Wilkinsburg, Pa., are agitating the question of organizing a paid fire department for the city. It is shown that a department containing twelve paid men can be supported at $12,000 a year.

—The Cincinnati headquarters of the fire department, it is reported, were recently wrecked by a fire, and much of the valuable apparatus destroyed. The fire originated in the Grand Opera House, which adjoined the headquarters building.

—The village of Bath, N. Y., recently divided the territory into four fire wards. It is the intention to indicate by the ringing of the bell in which ward the fire happens to be located. This is a step in the right direction; the next move should be to put in a modern fire alarm equipment, adapted to the needs of a small town.

—Through the baneful influence of partisan politics Chief H. N. Cook, the efficient head of the St. Paul department, has been removed to make room for the favorite of the new administration. The new man will doubtless fill the bill, but it is a pernicious system which removes a faithful servant of so important a branch of the public service as that of the fire department, without a just cause.

—Superintendent F. C. Mason, of the Brooklyn Police Telegraph, has received a large number of requests from mayors and other city officials interested in the fire and police departments, for copies of his paper read at the recent meeting of the League of American Municipalities, at Charleston, S. C. At the recent meeting of the International Association of Municipal Electricians, held in Pittsburg, a committee was appointed to draft a set of rules for municipal inspection and construction to be presented at the next meeting of the association, to be held at Niagara Falls in September. The object of this work is to promote uniformity in all departments, and to this end Mr. Mason requests all municipal electricians or city officials having a book of rules governing this work to forward him a copy for the benefit of the committee.

A NEW ELECTRIC FIRE ALARM.

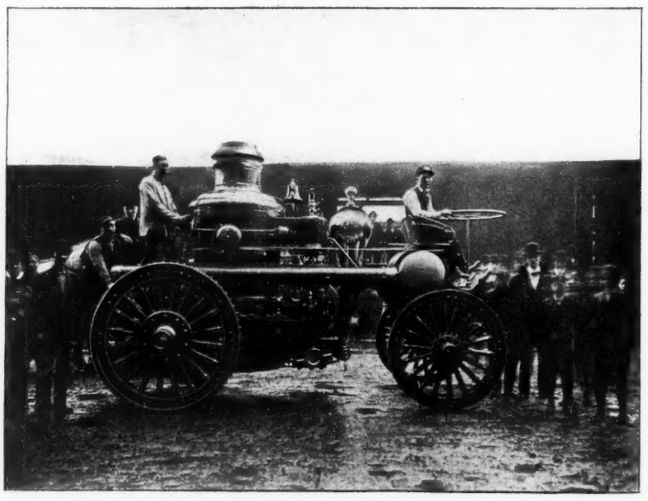
A NEW electric fire alarm is intended to announce the appearance of fire to passers-by outside the building in which it is placed. It consists of a metallic case containing a charge of a pyrotechnic compound similar to Bengal light, and surmounted by a small igniting charge in which is buried an electric fuse. The whole is made watertight and is arranged to be put in position on a cornice or other prominent part of the building.

The fuse is connected through thermostats with a battery, so that a high temperature in the vicinity of one of the thermostats closes the circuit, explodes the igniting charge and lights the slow-burning compound, which gives a brilliant light and thus attracts the attention of people in the neighborhood.

PITTSBURG'S HORSELESS FIRE ENGINE.

THE automobile fire engine, the latest acquisition of the Pittsburg fire department, recently made its maiden trip. The trial run was over several down-town streets, just to test the propelling machinery. The result was satisfactory, and highly interesting to a crowd, which followed the horseless engine for blocks. Some of the down-town streets are rather steep, and there was some apprehension lest it should be unable to climb them; but the fear was shown to be groundless, for the engine ascended the steepest hill with apparent ease. At the steepest pitch it was stopped and started again.

The engine cost $9,200 and is able to throw 1,350 gallons of water a minute. Three men are required to handle the machine—a tillerman, engineer and stoker. The engine can be taken anywhere that one drawn by horses can go, but will be used only to answer second or general alarms in the down-town districts. Steam, which is the propelling power,



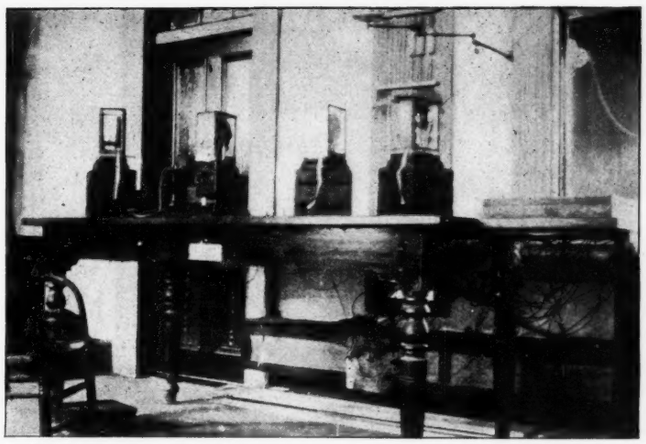
PITTSBURG'S HORSELESS ENGINE ON TRIAL TRIP.

will be carried at all times. The road-driving power is applied from one end of the main crank shaft, through an equalizing compound and two endless chains running over sprocket wheels on each of the rear wheels. These wheels can be run at varying speeds when turning corners. The driving power is made reversible. The engine is steered by a tiller wheel operated from the driver's seat. When it arrives at a fire a pin is removed from the main shaft, which disconnects the machinery from the rear wheels and prepares it for fire duty. The engine is from the Manchester locomotive works, and weighs 17,000 pounds. This style of machine is in use in but very few other cities, and its introduction in Pittsburg is viewed with much interest.

NEW POLICE ALARM SYSTEM OF CHARLESTON.

IT is only a trifle over a decade ago since the watchman made his rounds through the city of Charleston crying the hours of the night and keeping an eye out for the midnight prowlers. Not until 1888 did the city have what might be called a well organized and equipped police department, at least so far as the public alarm service was concerned. Then the watchman with a lantern was superseded by a full uniformed and well disciplined police force, and electricity was brought into service to carry the messages of the officers into headquarters, while patroling their lonely beats.

This was considered a great achievement for Charleston in those days, but the city has felt the thrill of the industrial



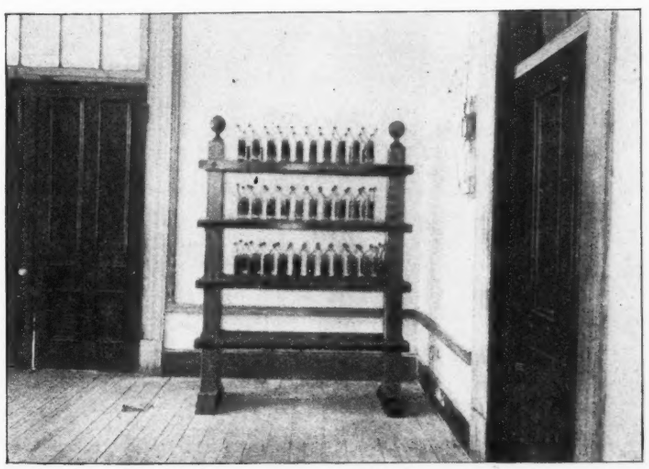
OLD POLICE TELEGRAPH SYSTEM OF CHARLESTON.

awakening that has so affected the Southland during the last five years, and entertains much higher aspirations, and will not, therefore, be satisfied with anything but the best. It was this spirit that moved the Council to authorize City Electrician Ion Simons to arrange for the installation of the latest and most complete police alarm equipment that could be constructed. After due consideration Mr. Simons settled upon the system manufactured by the well-known Gamewell Company, of New York, as best adapted to the needs of Charleston.

The new plant was installed without interfering with the service performed by the old system, and everything was completed and placed in running order on the 5th of last July. The new system includes fifty-two police boxes on the streets; fifty-six miles of wire, divided into three circuits; and a storage battery.

During the first six months, from July 5 to December 31, 1900, there were 1,433 wagon calls, and 32,973 telephone calls, or a total of 34,406.

The old system was known as the Chicago pattern, and never gave complete satisfaction, because it lacked some of the most important provisions of the latest work of the Gamewell police telegraph. The work of the police department, like everything else in civic life, has grown more and more complicated, but the inventor has enabled the service to keep pace with the demands by the clever devices that have been created for the especial purpose of preventing crime and apprehending criminals.

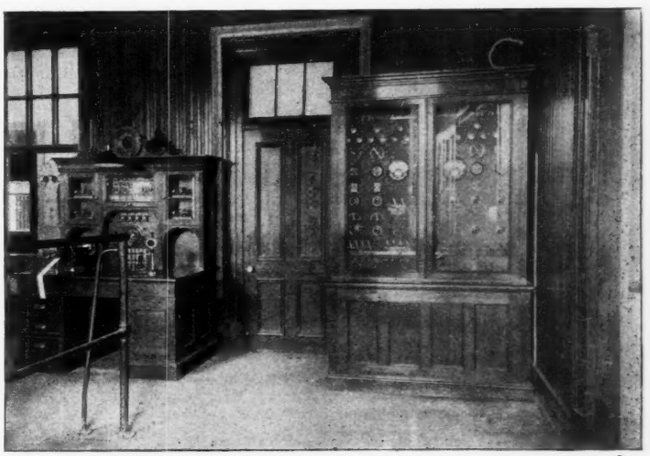


STORAGE BATTERY—CHARLESTON POLICE TELEGRAPH.

At the time the old system was installed in Charleston it was considered a fairly good equipment, but a glance at the illustrations will show how inferior it is to the new.

The office outfit consists of a cabinet, switchboard, batteries, etc. The central office cabinet is fully equipped for four circuits, complete with four open registers for recording signals from street stations and boxes, one stamp for automatically stamping the exact date—year, month, day, hour, and minute—of the receipt of signals, lightning arresters for the purpose of protecting the apparatus from abnormal electric currents, and, in fact, everything that is necessary for the most improved alarm system.

City Electrician Simons followed the example of other up-to-date cities, and insisted that the storage battery should be included in the outfit, for practical tests have demonstrated the superiority and economy of the storage over the gravity battery for fire alarm and police telegraph services.



NEW CENTRAL STATION—CHARLESTON POLICE TELEGRAPH.

INTERESTING FACTS ABOUT LONDON.

It costs £13,146,000 per annum to run the Government of London.

The population of London has increased from 958,788 in 1801 to 4,600,000 in 1901.

More than 4,000,000 baths were taken at the two scores of London's bath-houses last year.

London has twenty-one municipal cemeteries and ten which are owned by private companies.

During the summer of 1899 nearly 900 band concerts were given at forty-eight different places.

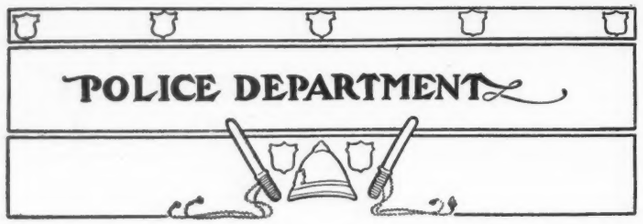
Gymnasiums for adults and children, to the number of twenty-four are provided and maintained at the public expense in the parks of London.

There are forty-two corporations, or cities as they would be called in the United States, which form Greater London, with its 4,600,000 inhabitants.

London has fifty-six parks and gardens of from one-fourth of an acre to 198 acres, and thirty open spaces and commons, from one to 267 acres in size.

There are 466 tennis courts in the various parks of London, and more than 45,000 games were played last season. About 15,000 games of cricket were played during the year.

The city owns, at the present time, completed dwellings, containing over 1,500 tenements, erected solely for the benefit of the working classes. One housing scheme, the largest ever attempted in London or elsewhere, involved the expenditure of £282,263.



M. J. Norris is the new Chief of Police of Augusta, Ga.

* * *

Fred. Pfister has been elected Chief of Police of Racine, Wis.

* * *

Russell Jordan has been made the Chief of Police of Port Gibson, La.

* * *

Ziba Carpenter has been appointed as Chief of Police of White Plains, N. Y.

* * *

The city of Waterbury, Conn., is to have an increase of the force and also a new police alarm telegraph system.

* * *

Manila is to have a police force made up of Americans; the members will be selected from the volunteers who wish to remain in the Philippines. It will number 300 men.

* * *

Pittsburg, Pa., has followed the example of Cincinnati, and opened a school for policemen in connection with its police department. This is at the suggestion of Chief A. H. Leslie.

POLICE STATISTICS OF FIFTY-TWO CITIES.

THE tables of police statistics which follow were compiled from information furnished by the chiefs of the departments to the MUNICIPAL JOURNAL AND ENGINEER, and, therefore, they may be considered reliable. Some interesting comparisons and contrasts will be found by even a cursory examination:

TABLE No. I.

City.	Population.	Total No. force.	Patrolmen.	Officers.	Detectives.	Mounted policemen.	Bicycle policemen.	Patrol wagon	No. arrests.
Augusta, Ga.		67	53	12	2	..	..	2	3,373
Albany, N. Y.		162	131	22	5	8	2	1	2,345
Allegheny City, Pa.		143	100	24	6	..	8	3	2,935
Atlanta, Ga.		175	142	14	8	12	18	5	15,172
Brockton, Mass.		34	29	4	4	..	2	1	1,387
Bridgeport, Conn.		54	46	6	2	..	4	2	2,655
Boston, Mass.		1,135	928	162	22	30	18	19	39,760
Cambridge, Mass.		107	97	12	2	..	2	2	3,138
Canton, O.		27	18	3	..	..	..	1	1,022
Cleveland, O.		356	295	52	11	..	..	5	15,674
Cincinnati, O.		531	395	59	11	19	18	10	12,860
Chicago, Ill.		3,267	2,440	296	57	..	4	43	71,349
Detroit, Mich.		514	419	70	17	17	14	7	7,052
Des Moines, Ia.		47	27	8	4	2	..	2	3,483
Dayton, O.		75	58	6	4	8	2	2	4,150
Evansville, Ind.		60	39	7	4	..	..	2	1,776
Fall River, Mass.		125	97	12	4	..	3	1	4,491
Grand Rapids, Mich.		95	62	6	6	..	..	2	1,890
Indianapolis, Ind.		175	121	15	12	..	6	2	5,454
Jersey City, N. J.		338	270	53	13	6	7	6	8,000
Lawrence, Mass.		58	46	..	2	..	..	1	...
Louisville, Ky.		330	264	40	10	16	..	6	8,048
Minneapolis, Minn.		218	170	25	8	20	6	3	5,614
Mobile, Ala.		55	45	6	4	4	..	1	4,414
New Haven, Conn.		176	144	23	9	3	2	3	6,314
New York City.		7,404	6,249	801	90	243	102	62	138,875
New Bedford, Mass.		102	72	17	2	..	8	1	2,237
Norfolk, Va.		87	74	9	4	..	4	1	7,393
New Orleans, La.		318	200	45	8	25	2	6	21,347
Nashville, Tenn.		100	76	11	7	6	..	2	...
Omaha, Neb.		77	49	7	10	..	2	2	8,186
Oakland, Cal.		61	47	5	2	2	5	2	2,838
Peoria, Ill.		96	83	8	5	..	..	2	439
Providence, R. I.		294	255	34	5	12	1	6	8,663
Pittsburgh, Pa.		436	311	40	14	6	18	10	18,762
Quincy, Ill.		30	16	14	2	..	..	1	804
Springfield, Mass.		62	52	8	2	5	5	2	2,473
Scranton, Pa.		54	42	9	1	2	..	1	3,000
St. Paul, Minn.		182	160	18	4	10	..	4	4,100
Salem, Mass.		38	31	4	..	..	..	1	622
San Francisco, Cal.		589	505	84	25	16	2	9	26,448
San Antonio, Tex.		43	28	3	2	10	..	..	3,986
St. Joseph, Mo.		65	48	4	5	..	..	2	2,300
Syracuse, N. Y.		137	107	16	7	..	..	4	4,000
Trenton, N. J.		97	73	15	2	..	4	2	2,334
Tacoma, Wash.		40	28	5	4	2	3	1	3,601
Troy, N. Y.		100	80	..	3	..	..	..	...
Williamsport, Pa.		17	14	..	..	..	1	..	751
Worcester, Mass.		138	118	20	3	2	6	2	4,964
Washington, D. C.		586	540	46	14	51	45	9	25,943
Youngstown, O.		45	26	2	1	..	..	1	3,556
Yonkers, N. Y.		52	43	..	1	8	5	2	1,431

TABLE No. II.

Salaries per year.

City.	Chief.	Captain.	Sergeant.	Patrolman.	Who pay for uniform?	Pistol Practice?	Gymnasium?	Baths?
Augusta, Ga.	$1,500	...	$840	$720	Men	No	No	Yes
Albany, N. Y.	2,500	$1,200	1,000	900	Men	No	No	Yes
Allegheny City, Pa.	2,000	1,200	950	950	Men	No	No	No
Atlanta, Ga.	2,200	1,200	912	730	Men	No	No	No
Brockton, Mass.	1,500	900	...	900	Men	No	No	Yes
Bridgeport, Conn.	2,000	1,200	1,040	960	Men	Yes	No	Yes
Boston, Mass.	3,500	2,000	1,400	1,200	Men	No	No	Yes
Cambridge, Mass.	2,000	1,400	1,186	1,095	Men	No	No	Yes
Canton, O.	*1,000	...	715	715	Men	No	No	No
Cleveland, O.	3,500	1,500	1,100	1,000	Men	No	No	Yes
Cincinnati, O.	5,000	...	1,080	960	Men	No	Yes	Yes
Chicago, Ill.	6,000	2,250	1,200	1,000	Men	Yes	Yes	Yes
Detroit, Mich.	4,000	1,500	1,000	900	Men	No	No	Yes
Des Moines, Ia.	1,200	900	780	720	Men	No	No	Yes
Dayton, O.	2,500	1,100	900	780	Men	No	No	No
Evansville, Ind.	1,800	1,200	936	819	Men	No	No	Yes
Fall River, Mass.	1,900	1,200	...	958	Men	No	No	Yes
Grand Rapids, Mich	2,300	1,200	1,000	748	Men	No	No	Yes
Indianapolis, Ind.	2,000	1,080	900	821	Men	No	No	Yes
Jersey City, N. J.	3,000	2,000	1,200	1,000	Men	No	No	Yes
Lawrence, Mass.	1,200	1,100	1,000	912	Men	No	Yes	No
Louisville, Ky.	2,500	1,300	900	820	Men	No	No	Yes
Minneapolis, Minn.	3,000	1,200	1,000	900	Men	No	Yes	Yes
Mobile, Ala.	1,500	...	720	600	Men	Yes	No	Yes
New Haven, Conn.	2,500	1,550	1,186	1,095	Men	No	No	Yes
New York City.	6,000	2,750	2,000	1,400	Men	No	No	Yes
New Bedford, Mass	1,800	1,250	1,075	1,003	Men	No	Yes	No
Norfolk, Va.	1,800	1,095	1,004	820	Men	No	No	No
New Orleans, La.	3,000	1,000	840	600	Men	Yes	No	No
Nashville, Tenn.	1,800	...	900	810	Men	No	No	Yes
Omaha, Neb.	2,000	1,080	1,020	840	Men	No	Yes	Yes
Oakland, Cal.	2,100	1,500	1,200	1,200	Men	Yes	No	No
Peoria, Ill.	1,200	960	900	780	Men	Yes	Yes	Yes
Providence, R. I.	2,500	1,400	1,142	1,095	Men	No	No	Yes
Pittsburgh, Pa.	3,000	1,200	1,004	912	Men	Yes	Yes	Yes
Quincy, Ill.	1,000	...	720	660	Men	No	Yes	Yes
Springfield, Mass.	1,800	1,075	950	900	Men	No	No	Yes
Scranton, Pa.	1,500	1,000	900	900	Men	Yes	No	No
St. Paul, Minn.	2,500	2,000	900	840	Men	No	No	No
Salem, Mass.	1,500	1,000	...	912	Men	No	No	No
San Francisco, Cal.	4,000	2,400	1,500	1,200	Men	Yes	No	No
San Antonio, Tex.	2,000	1,324	...	780	City	No	No	No
St. Joseph, Mo.	2,000	1,200	1,000	840	Men	No	Yes	Yes
Syracuse, N. Y.	2,700	1,800	1,020	900	Men	No	Yes	Yes
Trenton, N. J.	1,500	1,080	900	780	Men	No	Yes	Yes
Tacoma, Wash.	1,200	900	780	720	Men	No	No	No
Troy, N. Y.	2,200	1,050	950	850	Men	No	No	Yes
Williamsport, Pa.	960	600	600	600	Men	No	No	No
Worcester, Mass.	2,000	1,200	1,100	1,004	Men	No	No	Yes
Washington, D. C.	3,300	1,800	1,140	1,080	Men	Yes	No	Yes
Youngstown, O.	1,350	...	...	840	Men	No	No	No
Yonkers, N. Y.	2,400	...	1,600	1,200	Men	No	Yes	Yes

* And Fees.

—The bonded indebtedness of New York City amounts to $362,269,143.

—Lincoln, Neb., has the second highest tax rate of the 129 largest cities, $77.15 on each $1,000.

—It cost more than $4,000,000 to keep the streets of New York cleared of snow and dirt.

—Chicago paid $520,931 for lighting its 191 square miles in 1899, as opposed to Philadelphia's $1,133,427 for lighting its 132 square miles.

HEALTH DEPARTMENT

LAST year Mobile, Ala., had the highest marriage rate—20.6; and Scranton, Pa., had the lowest—2.7.

* * *

SANDUSKY, O., needs a better system of milk inspection. Buffalo and Rochester have models which can be profitably patterned after.

* * *

ANTI-SPITTING ordinances are rapidly increasing in number throughout the country, but there is little diminution in the spitting habit.

* * *

FALL RIVER, Mass., according to the report of the last census, has the highest birth rate of any city in the United States—38.75 per 1,000 of the population; St. Joseph, Mo., has the lowest—5.99.

* * *

THE lowest death rate in the United States, on the basis of the last census, is found in Seattle, Wash., and the highest in Charleston, S. C. The former is 7.43, and the latter, 39.94 per 1,000 population.

* * *

HORACE KNAPP, agent of the Lowell, Mass., board of health, reports the lowest death rate for 1900 in that city for a period of twenty-one years. The department has had wonderful results from anti-toxin and rare success in suppressing contagious diseases.

* * *

THERE have been more deaths from pulmonary diseases thus far this winter in Chicago, it is claimed, than ever before in the history of the city. The drainage canal is blamed as the cause for this and the large increase in other diseases. More than 100,000 cases of grip were recently reported.

* * *

PITTSBURG reports 6,269 deaths for 1900, of which 465 were from typhoid fever. During the year there were 3,341 cases of typhoid fever, which is 1 per cent. of the population. This is the highest typhoid record in the history of the city, and is due, it is claimed, to the impure water supply.

* * *

MANY city health officers report remarkable results from the use of anti-toxin during 1900. This remedy is one of the greatest achievements of the Nineteenth Century in the medical world. It has taken all the terror out of diphtheria and marked it down in the scale as less serious than scarlet fever. And the good results in large cities are chiefly due to the vigilance and fidelity of health officers.

NEW PUBLIC HEALTH LAWS.

THE State Board of Health of Wisconsin proposes to introduce several important bills which are for the benefit of the State at large. The four principal bills are as follows:

"A bill requiring plans for sewerage and water works systems to be submitted to the State Board of Health, before the work of construction is commenced, that the water supply in all parts of the State may be free from pollution of sewage.

"A bill providing for compulsory vaccination when deemed advisable by local boards of health in times of epidemics of smallpox.

"A bill to permit of the transportation of the corpses of those who have died of diphtheria and other contagious diseases, providing they have been prepared for shipment by undertakers who would be required to have licenses from the State board for this work, under the provisions of the bill. This measure is to correspond with those in most other States.

"A bill providing for the establishment of a State Board of Health laboratory, with a competent chemist, for the examination of water, this laboratory to be located at Milwaukee or Madison, with the preference for Milwaukee. The appropriation for the Health Board's work would have to be increased from $6,500 a year to $10,000 for this work."

DEATH RATE OF CIVIC POPULATION.

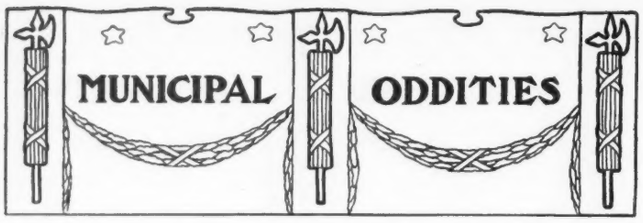
THE census for 1900 played havoc with the estimated population of many cities. Most of them went 'way beyond the mark, and reluctantly ate humble pie after the announcement of the official returns.

The general effect throughout the country has been to raise per capita averages, including the death rate, per 1,000 population. The following table gives the estimated population of the city and the death rate based on those figures, and the death rate based on the enumeration of the twelfth census. Fifty cities of the 129 largest are included in the list:

	Estimated Population.	Death rate per 1,000.	Census of 1900.	Death rate per 1,000.
New York, N. Y.	3,550,053	18.41	3,437,202	19.01
Chicago, Ill.	1,750,000	14.57	1,698,575	15.01
Philadelphia, Pa.	1,266,832	18.78	1,293,697	18.96
St. Louis, Mo.	623,000	16.09	575,238	17.43
Boston, Mass.	555,057	20.12	560,892	19.91
Baltimore, Md.	541,000	18.77	508,957	19.95
Cleveland, O.	395,000	14.07	381,768	14.55
Buffalo, N. Y.	370,000	12.60	352,219	13.92
San Francisco, Cal.	360,000	19.74	342,782	20.73
Cincinnati, O.	405,000	14.81	325,902	18.41
Pittsburg, Pa.	306,115	19.67	321,616	18.72
New Orleans, La.	300,000	26.31	287,104	27.49
Detroit, Mich.	300,000	15.13	285,704	15.89
Milwaukee, Wis.	285,000	13.48	285,315	13.47
Washington, D. C.	287,462	20.96	278,718	21.62
Newark, N. J.	240,000	18.90	246,070	18.44
Jersey City, N. J.	200,225	19.25	206,433	18.67
Louisville, Ky.	226,678	15.52	204,731	17.19
Minneapolis, Minn.	225,602	9.23	202,718	11.08
Providence, R. I.	168,000	18.82	175,597	18.01
Indianapolis, Ind.	200,000	11.94	169,164	15.22
Kansas City, Mo.	200,000	13.47	163,752	16.45
St. Paul, Minn.	200,000	7.85	163,632	10.79
Rochester, N. Y.	180,000	12.70	162,435	14.42
Denver, Colo.	170,000	12.56	133,859	15.95
Auburn, N. Y.	35,000	13.91	30,345	16.05
Butte, Mont.	50,000	12.16	30,470	19.95
Canton, O.	40,000	7.75	30,667	10.11
Joliet, Ill.	40,000	10.55	30,720	13.74
Taunton, Mass.	28,167	23.36	31,036	21.20
Rockford, Ill.	35,000	7.77	31,051	8.47
Superior, Wis.	35,000	10.06	31,091	11.32
Chattanooga, Tenn.	40,000	15.28	32,490	18.81
Knoxville, Tenn.	44,000	12.45	32,637	16.79
Sioux City, Ia.	45,000	6.96	33,111	9.45
Topeka, Kan.	35,000	13.80	33,608	14.37
Malden, Mass.	33,000	13.76	33,664	13.49
Chelsea, Mass.	34,235	18.58	34,072	18.67
Springfield, Ill.	42,000	12.69	34,159	15.60
McKeesport, Pa.	35,500	15.27	34,227	15.84
Davenport, Ia.	40,000	11.70	35,254	13.28
Allentown, Pa.	40,000	12.90	35,416	14.57
Elmira, N. Y.	40,000	13.38	35,672	15.00
Johnstown, Pa.	35,000	15.83	35,936	15.42
Salem, Mass.	36,000	19.78	35,956	19.80
South Bend, Ind.	.....	....	35,999	....
Quincy, Ill.	43,000	11.58	36,252	13.74
Duquque, Ia.	45,000	9.62	36,297	11.93
Terre Haute, Ind. (c)	45,000	9.04	36,673	11.10
Spokane, Wash.	40,000	12.78	36,848	13.87

A RECENT investigation of the tax collector's office of New Haven, Conn., revealed a deficit of $2,580, and an extremely lax system of doing business.

SECRETARY JOHN MACVICAR, of the League of American Municipalities, is opening a vigorous canvas among the cities not already members of the League. In a recent circular addressed to the mayors he names ten good reasons for joining the League, any one of which should be sufficient for an up-to-date city official.



Mayor Ames, of Minneapolis, is opposed to a police force made up of one nationality to the exclusion of others. For this reason he is weeding out the Irishmen on his force.

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The city of Barcelona, Spain, at a recent meeting presided over by former Mayor Señor Erobert, passed resolutions demanding of the Spanish Government the suppression of bullfights.

* * *

The "Committee of One Hundred," of Wheeling, W. Va., has a generous amount of space reserved in one of the daily newspapers of the town for its exclusive use, in which it says what it likes, and what it does not like, about the men, politics, and things in the City Hall.

* * *

"Friendly calls at the City Hall, in Woburn, Mass.," asserts Mayor Davis, "cost the city $10,000 per year. Hereafter all callers must state their business before they will be admitted to the various departments, and then they must transact it outside the rail, as would be done in any business house."

* * *

Chicago feels justified in poking fun at New York for still having sixteen horse car lines in operation. It is not so long ago that they were discarded in the "Windy City," but in the light of modern progress it does seem a trifle odd for the metropolis of the United States to be still running horse cars.

* * *

Curious ideas are put in operation on the other side of the Atlantic. The latest is from Berlin. The city fathers have had the poorer classes of the city temporarily exchange children with similar families in the country, thinking thereby to benefit the children by an exchange of experiences. Thus far the scheme has worked smoothly.

* * *

Register James R. Howe, of Brooklyn, N. Y., declares that no man can earn more than $5,000 a year, and, for that reason, he purposes giving the balance of his salary to some public benefaction. He said that, besides giving $8,000 to a hospital, he had accumulated over $45,000 in the year 1900, and could have made $20,000 more. He has planned to erect, at his own expense, a $50,000 statue of Washington.

* * *

Queer experiences come to Dr. Richard Curran, clerk of the police court of Rochester, N. Y. About twice a year the doctor holds an auction, thus realizing on the unclaimed articles left with him by prisoners. Articles that figure as exhibits, or evidence in cases, are also left on his hands. Among the latter "exhibits" is a man's ear, preserved in alcohol, which is a memento of a bloody battle between two Italians last summer.

* * *

The oddest municipal paper in the country is issued every Saturday at New Orleans, La. At the first glance one would take it to be a paper devoted to poultry raising, for on its cover is a large picture of a game cock, while at the top is its name—"CHICK"—in large letters. On the side the reader is told that is is devoted to "National, State and Municipal Politics and Affairs." About the only thing that may be said in its favor is that it is unique.

* * *

By a peculiar provision of the city charter of Biloxi, Miss., the Mayor is permitted to cast two votes under certain conditions. For the first time in the history of the city the Mayor exercised the privilege at the recent organization of the new city government. An administration man was up for office, and received within one vote of a tie, whereupon the Mayor cast the vote which made it a tie, and then the deciding vote, which elected his candidate to office.

"Mayor John F. Hurley, of Salem, Mass., is dark, probably drastic, but not dull," says one of the local papers. He is described as the most remarkable man in Salem. Though an ex-liquor dealer, he never tasted liquor. Though a man of the world, he never plays cards. Though a pawnbroker, he is noted for his charity and generosity to the poor. He never saw but one game of base ball. He has declared his intention of giving all his salary as Mayor of the city to charity.

* * *

"Divine Healer" Francis Truth, who hoodwinked Bostonians so extensively last year, has been conducting his machinations in Jacksonville, Fla., of late. His pernicious methods have become so oppressive to his followers and so obnoxious to the citizens that Mayor J. E. T. Bowden recently called a special session of the City Council and had an ordinance passed requiring Truth, and others of his ilk, to pay an annual license of $2,500, in default of which a fine of $500, or imprisonment for ninety days, will be imposed.

RIVAL ALDERMANIC POETS.

"If I am permitted to make the ballads, I do not care who makes the laws," said an old-time poet. Certain aldermen of New York and Chicago, although they have been chosen to make the laws, have determined also to have a hand in the ballad making. Alderman John J. Coughlin, better known as "Bathhouse John," of Chicago, established the precedent by writing a song entitled, "Dear Midnight of Love." The first stanza follows:

"When silence reigns supreme, and midnight love fortells,
If hearts could be seen, there kindest thoughts do dwell;
In darkness fancies gleam, true loving hearts do swell;
So far beyond a dream, True Friendship never sell.

Chorus:

"Dear Midnight of Love, why did we meet?
Dear Midnight of Love, your face is so sweet.
Pure as the angels above, surely again we shall speak.
Loving only as doves, dear Midnight of Love."

Alderman Bridges, of New York, not to be outdone by "Bathhouse John," called upon his muse and turned out a song entitled the "Day of Love," the first verse of which follows:

"Life is so sweet in these sunny hours,
When springtime affection is in its flower;
When the noonday of loving has come in our sky,
And casts its effulgence on us passing by.

Chorus:

"In rapturous cadence falling,
Moments of bliss recalling,
Happiness ever enthralling,
Is the Day of Love."

Alderman Bridges, in commenting upon the work of his rival, says: "I claim they are no lofty sentament in the Bath House's song, and that's where mine is warm propperty. Mine's got the lofty tone that you need to Appeal to the masses. If it hadn't ennything else but that it ought to live, and I think it will, but I claim that it's moraler than 'Dear Midnight of Love.' I don't believe in singing about ennything that can't happen right out in the open."

WESLEY W. HYDE, of Grand Rapids, Mich., in reply to an inquiry from the MUNICIPAL JOURNAL AND ENGINEER, writes that his city has what is called a Civic Federation of more than one hundred members, who have agreed to contribute $20 per year each for five years toward the expense of the federation. It is proposed to employ a secretary who will give his whole time to the work. The affairs of all city departments will be thoroughly investigated, and if there appears to be extravagance or corruption most vigorous methods will be employed to correct the evil.

WATER WORKS DEPARTMENT

A proposition for the securing of a water works system for Lockport, N. Y., is being discussed.

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The city of Joliet, Ill., proposes to expend $240,000 in enlarging its artesian well capacity to 6,000,000 gallons per day.

* * *

The city of Charlotte, N. C., recently punished several members of the city administration for drawing a seine in the reservoir.

* * *

There is a movement on foot in Butler, Mo., to purchase the water works system, which is now operated by a private company, for the city.

* * *

Terre Haute, Ind., has a proposition before the public to purchase the water works and electric lighting plants which are now operated by private companies.

* * *

Kokomo, Ind., proposes either to buy out the water works company now operating in the city, or to construct a new system. If the old company will sell at a reasonable price the city will not construct a new plant.

* * *

The village of Amherst, Wis., contemplates the construction of a water works system for fire protection only, using a nearby water power to run the pump. It is possible that an electric light plant may be constructed at the same time.

* * *

Not long ago the Dunkirk, N. Y., water works installed a new Snow pump, with a daily capacity of 6,000,000. Its working has been watched with much interest by the authorities and, after a trial of a considerable period, it has been pronounced satisfactory in every way.

* * *

Assemblyman Morgan, of Brooklyn, has introduced a bill, prepared by the Manufacturers' Association, for the construction of a large storage reservoir for the Brooklyn water works, in Forest Park. Its capacity will be 40 per cent. greater than the aggregate capacity of the three Ridgewood basins.

* * *

It is reported that the village of Sandy Creek, N. Y., owns its water works system and has an exceedingly low rate to consumers: for a kitchen faucet, $1.46 per year is charged; for street and lawn sprinkling, per season, $1; washing wagons for the season, 50 cents; for bar purposes, $1.25, and bath tubs, 42 cents.

* * *

Cherryvale, Kan., voted to issue bonds last spring for the construction of a water works system, whereupon the private company operating in the town secured an injunction to prevent the carrying out of the plan. The court recently rendered a decision in favor of the city and the construction of the water works will be rapidly pushed to completion.

* * *

The water works of New Albany, Ky., have passed into new hands. The new company recently obtained a thirty-five year franchise from the city, which provides that the city shall pay $75 a year each for 200 fire hydrants, the amount aggregating something less than was paid the old company for a fewer number of hydrants. It is said that liberal rates have been made to the private consumers.

* * *

Former Chief Engineer John C. Trautwine, of the Philadelphia Water Bureau, named $8,000,000 as the sum necessary to supply that city with an adequate water supply. Later, a special commission went over the ground thoroughly, and reported it could be done for $12,000,000. Both estimates included sand filtration. It is now reported that the present administration proposes to spend $27,000,000 on the improvement.

* * *

The authorities of Monroe, La., have purchased the plant of the Monroe Electric Light and Water Works Company for a sum aggregating $78,000. This deal has been in the course of negotiation ever since last summer. The company put in its plant about ten years ago, and placed thereon a valuation of over $200,000. An expert employed by the city placed its actual value at the present time at the figures of the purchase price, and the negotiations ended at that.

* * *

James M. Hill, clerk of the Board of Water Commissioners, of Middletown, N. Y., writes that the following bids were opened on January 12, for furnishing and delivering on board the cars at Middletown, pipe and special castings, as follows: 2,460 tons of 2,000 pounds, 20 and 24-inch cast iron pipe, and 18,000 pounds special castings.

	Pipe per ton.	Special castings, per lb.
Warren Foundry and Machine Co., New York city.	$21.38	$0.02¼
John Fox & Co., New York city	22.75	02.1
Charles Miller & Sons Co., Utica, N. Y.....	20.90	0.02⅛
R. D. Wood & Co., Philadelphia	22.90	0.02⅜
U. S. Cast Iron Pipe & Foundry Co., Philadelphia..	22.70	0.02¼
M. J. Drummond & Co., New York city.....	22.00	0.02¼

The contract will probably be awarded to Charles Miller & Sons Co., of Utica, N. Y.

GREAT ENGINEERING FEAT.

A WONDERFUL piece of engineering is the new Jerome Park reservoir, which Contractor John B. McDonald is building for New York city on the former site of the famous race course in the Bronx. It is being blasted out of solid rock, the contract calling for the removal of 2,500,000 feet of earth and 3,000,000 of rock. This rock is of the hardest kind, almost granite, and 850 men are in service constantly blasting and drilling. When finished the reservoir will resemble a huge bath tub in shape and finish, for the bottom and half the slopes will be paved with stone and brick. At present the work is little more than half finished. When the big contract was awarded in 1895, it was thought that the work would be complete so that the reservoir would be in use in 1901, but it is now evident that it will be 1905 or a year later before it can be filled. The basin will cover 250 of the 300 acres purchased by the city from twenty property owners at a cost of about $1,000 per acre. Gatehouse No. 5, which will tap the new aqueduct where the old and new ones come together, will be the largest building of its kind in the country. Here will enter the water from the Croton Lake, as the new reservoir has not a single spring on which to feed.

VAST IMPROVEMENTS IN NEW ORLEANS.

THE city of New Orleans is at present engaged in an endeavor to introduce a new system of water supply, a new system of sanitary sewers and another one for drainage. Several years ago the city appropriated several million dollars to carry out a drainage system. Recently more bonds have been sold for $12,000,000, one-third of which amount is to be devoted to drainage, and the rest for the new water supply and sewerage.

An Advisory Board of Engineers was appointed last spring to consider plans for the latter two works. Major B. M. Harrod, who is the Chief Engineer of the drainage work, is also chairman of this Advisory Board of Engineers. Its

other members are Mr. Rudolph Hering, and Mr. George W. Fuller, both of New York City; Mr. Thomas L. Raymond, Mr. L. W. Brown, and Mr. A. C. Bell, all of New Orleans. Mr. Hering had previously been consulting engineer for the elaboration of the plans for the drainage and also for the sewerage company that started to put in a system, but later failed.

Mr. George G. Earl was Chief Engineer of the sewerage company, is now the superintendent of the present board, and is designing the new works under its direction.

The present water supply and sewerage are still both in the hands of private companies, and one of the first of the present duties will be a valuation of these works and their purchase by the city.

The New Orleans Water Works Company has a franchise to run about thirty years more, and this franchise operates as a serious menace to the progress of any construction work by the new board.

It is proposed to cover the entire city with mains, both to supply water and to remove the sewage. Investigations are being made as to the best way to filter the Mississippi River water, also regarding the best source from smaller streams, which might not require filtration. Sewage is intended to be discharged into the Mississippi River below the city.

FAVORS MECHANICAL FILTRATION.

EARLY in January there was held in New York a hearing by the Senate committee of the District of Columbia, at which testimony on the relative merits of the slow sand and mechanical systems of filtration was taken. There was a large attendance of those interested in the subject, both systems being ably represented. The concensus of opinion seemed to favor mechanical filtration as being particularly adapted to the conditions at Washington.

Among those present who favored the mechanical filter was W. P. Mason, the eminent professor of chemistry of the Rensselaer Polytechnic Institute, of Troy, N. Y., and author of "Water Supply."

MACHINE FILTER REDUCES TYPHOID RATE.

Mr. Mason said as a general rule he preferred the slow sand system of filtration for large cities where the water is rather clear and the mechanical system for large cities where there is a great degree of turbidity, and for places where the water supply is small. Were he called on to give a snap judgment as to the system best adapted for Washington, he would prefer the slow sand filter unless there is special evidence in favor of some other form better suitable for local conditions. He had read the reports of the special committee of the Medical Society of the District of Columbia, and he felt that, in some respects, such comment and criticism almost take the form of special pleading.

"For instance," he said, "I do not see the wisdom of allowing the public to infer that in some in tances mechanical filtration of city water has been a direct cause of a decided increase in typhoid fever. No one who knows anything about filtration believes that to be a fact; and morevoer, so far as two of the cities are concerned, where such strange results are claimed, namely, Elmira, N. Y., and Lexington, Ky., I chance to know that the true state of things is quite the reverse of this, and that the filters have greatly improved the typhoid death rate."

NO DANGER FROM ALUM.

So far as alum was concerned, he said that in the mechanical system no alum reaches the consumer, and the aluminum hydrate formed goes to the sewer with the removal of dirt.

"The change," he said, "in the chemical composition of the water by the use of alum is a turning of carbonate of lime into sulphate of lime, which is a change without significance from a hygienic point of view, but one which is unpopular with steam users, because the scale formed by the sulphite attaches itself more firmly to the boiler tubes than does that resulting from the presence of carbonate of lime. It is, I think, unfortunate to make use of the expression 'sulphuric acid' when speaking of the operations of a mechanical filter. It is unnecessary, and, moreover, it frightens the uninitiated. Sulphates are involved in the form of filtration, but no free sulphuric acid. Would anyone think it wise to refer to the use of 'hydrochloric acid' as a part of our daily food when the real meaning intended was its combined form in the shape of common salt?

"In conclusion," he said, "let me say that although in the absence of experimental information I should have favored an English filter bed for Washington, yet now that a practical trial has been made, under the direction of reliable and competent men, I should consider it great lack of wisdom to attempt to question their findings or to discredit their recommendations."

This latter comment was in reference to the report of Colonel Miller, who commended the mechanical filter to Congress for the District of Columbia.

LIBRARY STATISTICS.

MEASURED by the number of volumes owned by the city, Boston is at the head, as it has, in its municipal public libraries, more than twice as many books as any other city in the United States. But when the total number of volumes in libraries open to the public is taken into consideration, it stands third in the point of precedence, New York coming first and Philadelphia second. And again, in the number of books withdrawn during the year, on a per capita basis, Boston leads among the larger cities. The achievement of the past century in the establishment of the free public library is one of the most notable. A glance at the following table of library statistics, showing the book assets of the twenty-five largest cities, cannot fail to interest the reader:

	No. of vols. in city libraries.	No. vols. other public libraries.	Total number vols.	Total No. withdrawn during year.
New York, N. Y.	86,651	3,204,004	3,290,655	3,964,789
Chicago, Ill.	296,307	907,771	1,204,078	1,690,904
Philadelphia, Pa.	203,102	1,228,372	1,431,474	2,224,562
St. Louis, Mo.	140,000	322,273	462,273	839,335
Boston, Mass.	740,064	651,786	1,391,850	1,253,410
Baltimore, Md.	199,000	256,655	455,655	720,500
Cleveland, O.	150,446	207,333	357,779	912,727
Buffalo, N. Y.	204,768	70,697	275,465	939,828
San Francisco, Cal.	117,737	214,201	331,938	735,678
Cincinnati, O.	225,775	306,887	532,662	400,460
Pittsburg, Pa.	98,600	.....	98,600	345,590
New Orleans, La.	45,000	150,000	195,000	84,000
Detroit, Mich.	159,507	29,420	188,927	451,602
Milwaukee, Wis.	115,285	38,700	153,985	449,132
Washington, D. C.	20,000	2,482,388	2,502,388	215,836
Newark, N. J.	70,674	.....	70,674	346,985
Jersey City, N. J.	67,486	.....	67,486	427,808
Louisville, Ky.	.....	87,950	87,950	.....
Minneapolis, Minn.	112,615	103,000	215,615	596,000
Providence, R. I.	.....	96,307	96,307	120,166
Indianapolis, Ind.	87,554	75,200	162,754	296,804
Kansas City, Mo.	45,000	13,500	58,500	206,323
St. Paul, Minn.	50,000	122,077	172,077	179,595
Rochester, N. Y.	33,287	144,875	178,162	160,711
Denver, Colo.	75,000	44,250	119,250	380,235

PUBLIC LIBRARIES.

Bangor, Me., is to have a new public library.

* * *

New York's new public library is to be built of marble, and will cost $2,850,000.

* * *

The will of the late Jarvis Ford, of St. Joseph, Mo., leaves $20,000 for a free memorial library in that city, and $10,000 to the Municipal Hospital.

* * *

Andrew Carnegie has offered to give $50,000 to the city of Lewiston, Me., for a new public library, provided the city will appropriate annually a sufficient sum for maintenance.

* * *

It is reported that Sioux Falls, S. D., has accepted an offer from Andrew Carnegie to give $25,000 for a public library provided the city would contribute $2,500 annually to maintain it.

* * *

Andrew Carnegie has offered to give $200,000 to the city of Syracuse, N. Y., for a new public library, provided the city will contribute a site and $30,000 a year for maintenance. Mayor James K. McGuire says that the city will gladly accept the conditions.

PROPERTY EXEMPT FROM TAXATION.

COMPTROLLER ERASTUS C. KNIGHT, of New York State, reports that in the cities of the State real property to the value of $723,344,441 is exempt from taxation. It is classed as follows:

Federal government, $55,647,055; State government, $39,104,660; county, $6,150,300; city, $344,354,887; school property, $35,352,590; churches, parsonages and cemeteries, $129,099,055; charitable and reformatory institutions, $58,855,526; property purchased with pension money, $2,009,173; miscellaneous property, $2,770,795.

The real estate in New York city exempted from taxation is used for the following purposes: Federal government, $48,969,750; State government, $4,778,150; city government, $311,307,345; schools, $53,580,395; churches, parsonages and cemeteries, $88,657,275; charitable and reformatory institutions, $45,356,945; property purchased with pension money, $291,052; miscellaneous, $143,540. The following table shows the amount of property exempted in each city:

Albany	$34,505,914	Middletown	$2,505,550
Amsterdam	797,200	Mt. Vernon	1,526,275
Auburn	3,596,204	Newburgh	2,034,100
Binghamton	7,092,789	New Rochelle	1,608,400
Buffalo	30,312,880	Niagara Falls	2,778,600
Cohoes	731,739	N. Tonawanda	480,056
Corning	331,950	Ogdensburg	625,200
Cortland	631,465	Olean	426,500
Dunkirk	432,363	Oswego	2,508,363
Elmira	4,058,695	Poughkeepsie	1,640,550
Geneva	1,083,513	Rensselaer	202,430
Gloversville	417,381	Rochester	11,795,475
Greater New York	553,084,452	Rome	51,169
Hornellsville	522,867	Schenectady	2,241,900
Hudson	1,307,500	Syracuse	18,305,775
Ithaca	10,339,620	Troy	7,526,679
Jamestown	1,641,550	Utica	5,695,150
Johnstown	415,800	Watertown	1,876,850
Kingston	83,959	Watervliet	595,800
Little Falls	400,650	Yonkers	6,900,478
Lockport	231,050		

664,837.—*Tree-Protector.* John W. Davis, Jr., Clarksville, Mo.

664,861.—*Street-Cleaning Roller.* Augustin Hentschel, Beriin, Germany.

664,878.—*Street-Cleaner.* Robert C. Menzies, Glens Falls, N. Y.

664,898.—*Fire-Extinguisher.* Harry E. Safford, Allegheny, Pa.

665,040.—*Automatic Fire-Alarm.* Albert R. Thompson, Indianapolis, Ind., assignor of two-thirds to Clarence M. Zener and John Wocher, same place.

665,137.—*Dumping-Wagon.* William O. Shadbolt, New York, N. Y.

665,157.—*Portable Apparatus for Melting Snow.* Tony Zetelle, Philadelphia, Pa.

665,423.—*Electromagnetic Cut-Out.* Richard Fleming, Lynn, Mass., assignor to the General Electric Company, of New York.

665,533.—*Balcony for Fire-Escapes or Other Purposes.* Albert Kuhl, New York, N. Y.

665,585.—*Fire-Escape.* Jacob A. Shuping, Morganton, N. C.

665,606.—*Apparatus for Purifying Water.* Cass L. Kennicott, Chicago, Ill.

665,616.—*Fire-Protective Apparatus.* Edwin J. McCormick, Syracuse, N. Y., assignor to the McCormick Manufacturing Company, New York, N. Y.

665,707.—*Fire-Escape.* Seneca H. Tromanhauser, Minneapolis, Minn.

665,736.—*Voting-Machine.* Andrew H. Hart, Winchester, Ky.

665,890.—*Fire-Controller.* Samuel Farrar, Cohoes, N. Y.

665,928.—*Electrical Cut-Out.* Charles G. Perkins, Hartford, Conn.

665,943.—*Electric Cut-Out.* John H. Trumbull, Plainville, Conn., assignor to Charles G. Perkins, Hartford, Conn.

666,103.—*Formaldehyde-Lamp.* Richard P. Kuhn, Alexandria, Va., assignor to the Kuhn-Formaldehyde Generating Company, of Virginia.

666,104.—*Formaldehyde-Generator.* Richard P. Kuhn, Alexandria, Va., assignor to the Kuhn-Formaldehyde Generator Company, of Virginia.

666,241.—*Tin-Lined Lead Pipe.* Albert Barraclough, Heckmondwike, England, assignor of five-eighths to Harry Hardwick, Philadelphia, Pa.

666,361.—*Underground Conduit.* Isaac D. Smead, Toledo, O.

666,383.—*Self-Closing Cock.* Albert Hansen, Copenhagen, Denmark.

666,399.—*Street Car Fender.* Richard Thompson, Buffalo, N. Y., assignor of one-half to George E. Troup, of same place.

666,533.—*Process of Purifying Water.* Jules H. Lavollay and Gustav E. Bourgoin, Paris, France.

666,579.—*Method of Producing Vapors of Formaldehyde.* Jean J. A. Trillat, Paris, France, assignor to La Societe Chimique des Usines du Rhone, anciennement Gilliard P. Monnet et Cartier, Lyons, France.

666,580.—*Hose Nozzle.* John P. Van Sickle, Passedena, Cal.

666,064.—*Automatic Fire-Extinguisher.* Millard F. Elliott, Philadelphia, Pa.

666,628.—*Fire-Alarm.* Walter J. Partridge, Norwood, Mass., assignor to the National Fire Alarm Company, of Maine.

THE Grand Jury of St. Louis has handed down twenty-four indictments against city officials. This is one of the results of a thorough investigation of municipal conditions.

PITTSTON, Pa., is said to have trouble of its own. One of its city officials was recently charged, in open council meeting, with accepting a bribe of $1,000 in connection with the purchase of a site for the new city hall.

MUNICIPAL LIGHTING IN SMALL TOWNS.

ONE of the most interesting papers presented at the recent meeting of the League of American Municipalities was that of Mr. Thomas C. Perkins, of Hartford, Conn., which gave a practical illustration of municipal ownership as seen in a small Connecticut town. As many of our readers are intensely interested in this subject, the paper is given in full, as follows:

"As a subject for this paper I have selected the municipal electric lighting plant of the borough of Wallingford, Conn., first, because it is of a size that would probably be of interest to the greater number of municipalities of this country who are considering the establishment and operation of their own electric lighting plant; and secondly, because this particular plant was designed and constructed under my immediate supervision, with the consequence that I feel amply qualified to discuss it.

THOMAS C. PERKINS.
Hartford, Conn.

"Wallingford is a busy manufacturing community, situated between the cities of New Haven and Hartford, some twelve miles or more from tide water, and is one of the few remaining communities in Connecticut still retaining the old style of borough government, by which the public affairs are entrusted to a warden and board of burgesses, who are elected each year by popular vote, and conduct public business on almost similar lines as our larger cities, which are governed by a mayor and common council.

"The matter of public lighting for both street and commercial purposes had, up to the time of the borough putting its own plant in operation, been carried on by a local gas light company, who furnished the poorest quality of gas at the highest price that any long-suffering community had to pay for.

"As the gas also had a happy faculty of going out entirely all over the borough from time to time, usually on Saturday evenings and always on Christmas Eve, and all the meters furnished read in dollars and cents instead of cubic feet, the consumers were in the dark in more ways than one the greater part of the time.

"Furthermore, the gas company had secured a franchise from the State Legislature authorizing them to furnish electric lighting service, but, although they never did so, by means of threats of going ahead in the matter they successfully prevented any outside private capital from taking the business up.

PUT IN A LIGHTING PLANT.

" Things lightwise had been going on in Wallingford from bad to worse until the winter of 1898 and '99, when, with the incoming of a new board of burgesses, the matter of the borough establishing its own electric lighting plant was taken up actively. The situation was gone over very carefully, estimates were prepared of the cost of building, equipping and operating a plant suitable for the needs of Wallingford and of the probable income that could be secured from the sale of commercial lights, as a result of which a special meeting of the borough was called, at which it was voted by a large majority that the borough should construct and maintain its own plant and that active steps should be taken at once.

"Specifications, plans, etc., were gotten out, bids secured and early in the following June the contract for the entire plant, erected and ready to be put in operation, was awarded. Work was commenced at once, and the plant was finished and put in operation the first day of January, 1900.

"Several acres of land were purchased some three-quarters of a mile from the business center, bordering the banks of Community Lake, upon which the power house was erected, thus securing an ample supply of water for boiler, feeding and condensing purposes at all times.

"As it was desirable for reasons of economy and simplicity, that not only the arc lights for the streets, but incandescent and arc lights, and, if necessary, power for commercial purposes, should be furnished by one type of generating apparatus, and in view of the amount of territory to be served, the selection was made in favor of the alternating current of low frequency system, with series alternating enclosed arc lamps for street lighting.

"The power station consists of a brick and iron building, with tar and gravel roofing, divided into three sections by brick partition walls, viz., boiler room, engine room and superintendent's office, etc. Its outside dimensions are 104 feet by 45 feet. The building, erected complete, ready for occupancy, foundations for the engines, generators, etc., and setting for the boilers, cost about six thousand dollars ($6,000.)

"The steam plant proper consists of two 150 horse-power high pressure horizontal boilers, each 19½ feet long by 72 inches in diameter, two Corliss type self-oiling engines, one rated at 300 horse-power and the other at 150 horse-power; one vertical type condenser, feed water heaters, pumps, necessary steam piping, etc.

"The electrical equipment of the power station consists of one 150 K. W., or 3,000 light, alternating current dynamo, which is belted to the larger engine, and one 75 K. W., or 1,500 light, alternating current dynamo, belted to the smaller engine (no counter shafts of any sort being used), exciters, switchboard and necessary transforming devices.

"The power station was designed sufficiently large and all piping and connections arranged to allow of the installation of a third engine, boiler and dynamo in the future of sufficient size to practically double the capacity of the plant if such an extension is found necessary.

"The cost of the steam and electric plant as above was about twenty-four thousand dollars.

THE FACILITIES SUPPLIED.

"Seventy-nine series alternating enclosed arc lamps and three alternating multiple enclosed arc lamps are used for lighting about eight miles of streets, the arc circuits requiring about fourteen miles of wire. The commercial lighting circuits are distributed widely over the business and residence section of the borough. Fully 90 per cent. of the commercial lighting is done from a secondary three-wire system of distribution, which in turn is fed from a number of 300-light transformers. There are about six miles of commercial lighting and secondary circuits. The cost of all the equipment outside of the station, consisting of pole line, wire, arc lamps, transformers, etc., was about ten thousand dollars ($10,000).

"In the superintendent's office at the power station are four recording type electric meters, one for each circuit going out of the building, upon which is recorded the total amount of electricity turned out and delivered to the lines each day. The time of starting up and shutting down and any variations occurring in each circuit are also recorded during each night's run by means of a number of Bristol recording gauges. All water used in the boiler passes through a meter and all coal used each day is weighed. All of these figures, with others, such as the amount of oil and waste used, the time of each engineer going on and off duty, etc., are kept accurate record of on the superintendent's log book from day to day.

"The management of the plant is vested absolutely in a board of three electrical commissioners, who were appointed by the board of burgesses, one commissioner to serve three years, one for two years and one for one year, and each year the board of burgesses appoints a new commissioner to serve in place of the retiring commissioner. These commissioners serve without salary.

FROM DUSK TO DAYLIGHT.

"The plant is operated from dusk to daylight every night in the year. The street lights, with the exception of three multiple lamps, located one at each business square and which burn all night every night, burn until midnight every night, except such times as the moon is actually shining, making the use of artificial illumination unnecessary.

"The charge of the plant and the details of management of the business is in the hands of the superintendent, who, besides acting

as chief engineer and electrician, also keeps the books, makes out the monthly bills and makes all collections. Two engineers are employed, the first engineer coming on duty at noon and taking charge of the plant until midnight, at which time the second engineer comes on and stays at the plant until the next noon. The remaining help consists of one lineman, who acts as trimmer and occasionally as fireman during the early part of the evening during times of heavy load. From time to time an extra man is employed to assist the regular lineman when there are a large number of new customers to be connected up, as has been the case recently.

"The total salary account for operating the plant, with the exception of the extra man, who is paid two dollars ($2) per day, when he is employed, does not exceed three hundred dollars ($300) per month.

"Incandescent lights for commercial lighting are furnished on a sliding scale of flat rates, or so much per month for each lamp, according to the number of hours used each night; the table of rates is based on a sliding price of current at ten cents per thousand watts per hour, which is substantially one-half cent per hour for each 16-candle power incandescent light. Where meters are desired they are furnished, the customer advancing the cost of the meter, which sum is refunded by the borough when the service is discontinued.

THE COST TO THE PUBLIC.

"The rate to everyone by meter is ten cents per K. W. without exception.

"No wiring inside of any buildings is done by the borough, the limit being the bringing of the service connections to the outside of the building free, if it is not more than fifty feet from the curb line. The first installation of lamps are free and after that charged for at cost. All customers are required to have their wiring done in strict accordance with rules drawn up by the borough, and if the work does not pass inspection by the superintendent service connections will not be made.

"Due to the low price and the excellence of the service the use of incandescent lighting in both houses and stores in Wallingford has become very general. There were connected upon November 1 last, ten months after the plant had been started, the equivalent of 4,000 16-candle power lamps, and new customers were coming in at a rate which will bring the total number up to 5,000 by the first of January.

"Under the general laws of the State of Connecticut, relating to municipal electric lighting plants, the municipality is required to raise by taxation and turn over to the electrical department each year a sum equal to the actual cost of maintaining the street lighting system, said cost to include all proper charges, including depreciation at the rate of 5 per cent. per year. Consequently it will be seen that the larger the output of the station for commercial lighting the cheaper will become the cost of the street lighting.

"To the extensive use of commercial lights, the high efficiency of the power plant and to the economical and skilful management of the business should be laid the remarkable showing for a plant that started with no business at all and has not yet been in operation one year.

"As a basis of figuring the cost of producing electricity in this plant, and the consequent cost of the street lighting, I have taken the month of October last, which is the last month of which I have complete figures. Also October is an average month in the year as far as the average number of hours street and commercial lighting are required. In other words if no new business were added or taken away the income and expenses for the month of October would be the average for the rest of the year.

STATISTICS FOR THE MONTH OF OCTOBER.

Total output of the station in K. W., 68,634; consumption, commercial circuits, 61,124; consumption arc circuits, K. W., 7,510; number of series arcs, 79; hours burned in month, 142; K. W. consumption per lamp hour apparent, 612; of multiple lamps, 3; hours burned in month, 403; K. W. consumption per lamp hour, 520; tons of coal used, 82; kind of coal, George's Creek, soft; cost delivered in power station, $4.40 per ton; cubic feet of water used in boilers, 25,629; evaporation, average for the month, per pound, of coal, including banking and cleaning fires, 8.85.

OPERATING EXPENSES FOR MONTH OF OCTOBER.

For labor, fuel, repairs and general daily expenses for carrying on business	$ 784.04
Fire insurance on power station	14.00
Boiler insurance	2.78
Indemnity insurance	15.60
Interest on $55,000 of bonds at 3½ per cent	160.42
Depreciation on cost of power plant, lines and equipment, 5 per cent. on $46,000	191.67
Total	$1,168.51

"Based solely on the cost of operating this plant without respect to the income received, the cost of producing one K. W. of electricity, said figure to include all fixed charges, depreciation at 5 per cent. and cost of carrying on the whole business, is substantially one and six one-hundredths cents (1 6-100).

On this basis the cost of running each series arc lamp per month is	$ 1.40
And of each multiple arc lamp is	3.35
Cost of each series, arc lamp annually on a basis of October.	16.80
And of each multiple arc lamp is	40.20

"In considering these figures it must be kept in mind that there is a difference between the actual cost of producing street lights with such a plant as I have described above, and what it actually cost the borough for the street lights for the month of October.

THE ACTUAL COST.

"In my opinion this figure should be arrived at by deducting the income from sale of commercial lighting from the expenses of operating the plant for the whole month, which expense should include interest and depreciation charges.

"During the month of October the total expenses were $1,168.51, and the income from commercial lighting was $761.51, the difference being $407. This was the sum then that the borough would have to make up, and represents the actual cost of the street lighting for that month.

"On this basis the cost of each series arc lamp per month is $4.62, and annually on a basis of October $55.44; on this basis the cost of each multiple arc lamp per month is $11.08, and annually on a basis of October $132.96.

"At the present time the income from commercial lighting is increasing at a rate of about $100 per month, so it can be readily seen that in a few months the income from such lighting will bring the cost of the street lighting down to the actual cost of producing electricity as aforesaid, with the prospect of a fair-sized surplus being accumulated in the early future, which can be applied to extensions or to reducing the bonded indebtedness of the borough through the cost of the electric plant.

"The alternating system of arc lamps has proved itself exceedingly satisfactory in every respect; they only require trimming once in a hundred hours, and it is proved by experience that they give a more effective and satisfactory illumination than the old style open arc lamp, of so-called 2,000 candle-power.

"No trouble is experienced in operating all classes of service from one dynamo. As with all such undertakings, there were some few objectors who prophesied dire distress on the part of the borough in the future if they attempted to engage in the electric lighting business, contending that a private corporation could do the business better and cheaper; that politics would soon ruin the plant, etc. These few, however, were soon won over when it was seen that the plant was destined to be a success, and now it would be impossible to find a citizen of Wallingford who is not heartily in favor of the borough operating its own plant. As a matter of fact, a syndicate, shortly after the plant was completed and put in operation, offered to buy it from the borough at an advance of $10,000 over what it had then cost, and this offer was not thought worth considering.

"In conclusion I would say that the plant has become so popular with the people that it is held on a level distinctly above politics and all such questions, and evil days would immediately befall any politician who might attempt in any way to meddle with its management. This certainly argues well for the future of the municipal electric light plant of the borough of Wallingford."

GAS STATISTICS OF ENGLISH CITIES.

	When acquired.	Capital.	Receipts.	Maintenance.	Balance.	Price per 1,000 cu. ft. in cents.
Aberdeen		£283,837	£91,562	£69,526	£23,036	75
Accrington		416,526	48,733	32,100	16,633	68-75
Belfast		858,625	186,354	139,829	46,525	..
Birkenhead	1858	375,200	92,060	66,000	36,060	41-79
Birmingham	1875	2,360,347	666,425	535,127	131,298	50-62
Blackburn	1877	755,493	100,371	60,421	39,950	75
Bolton	1872	646,025	143,988	80,090	63,898	50-75
Bradford	1871	670,000	222,964	203,183	19,781	56
Burton-on-Trent	1878	159,595	44,371	38,265	6,106	60-65
Bury	1858	272,406	48,883	44,382	4,501	56-75
Coventry	1884	219,971	65,684	52,972	13,712	54-66
Dewsbury		229,828	31,942	28,047	3,895	50-75
Dundee	1869	233,819	89,673	65,372	24,301	79
Edinburgh	1888	595,000	247,000	192,010	54,990	60-75
Glasgow	1869	1,076,500	700,149	627,160	72,989	54
Halifax		520,612	97,593	81,253	16,340	54-75
Huddersfield	1872	399,866	82,884	73,131	9,753	50-68
Leeds	1878	1,209,838	338,429	302,275	36,154	50
Leicester		904,704	218,448	183,613	34,835	58
Lincoln	1885	192,530	37,684	35,761	1,923	52
Manchester		2,050,813	594,969	455,917	139,052	56-62
Middlesbrough		276,377	53,469	41,087	12,382	75
Nottingham	1874	1,033,333	252,122	178,720	73,402	50-62
Oldham	1853	465,991	140,299	111,677	28,622	50-56
Rochdale		225,256	70,883	61,899	8,984	72-79
Salford		708,015	178,768	115,873	62,895	56-68
Southport		238,062	65,126	41,148	23,978	62-75
St. Helens	1875	264,065	42,281	34,867	7,414	50-75
Stockport		208,296	83,445	59,424	24,021	60-70
Wigan		335,242	60,043	46,785	13,258	75-87

A FEW cities have supplied their chief executive with the leading books upon practical municipal affairs, and some have gone further and provided a technical library for the city engineer and other municipal officials.

Controller Coler, of New York, is an omnivorous reader upon municipal topics. The official of a smaller city would say that he should be, because he is entrusted with such vast responsibilities, and then argue from that, because his responsibilities are so small, he —the official of the smaller city—would be exempt from the necessity of informing himself upon the affairs of his own department. The official who so argues is unfaithful, and not discharging his full duty, for the reason that the principle is the same in each case, and will require all the enlightenment within reach of the official. For this reason there should be provided for each department in the city government a collection of the leading works which relate to a particular department and such other subjects as may be needed. More than this, the head of each department would confer a lasting benefit upon his successors in office as well as upon his city, if he would establish the nucleus for such a departmental library. It would be well for every superintendent of water, electric lighting plant, street cleaning, engineeering and every other municipal department to follow this suggestion.

Beginning with this issue, the MUNICIPAL JOURNAL AND ENGINEER will give the titles, and, when space will permit, reviews, of such books and periodicals as will be of interest to the various city officials.

BOOKS.

Massachusetts Labor Legislation: An Historical and Critical Study. By Sarah Scovill Whittelsey, Ph. D. American Academy of Political and Social Science, Philadelphia. Paper, $1.

Street Pavements and Paving Materials. By George W. Tillson, Mem. Am. Soc'y C. E. 544 pp. $4. John Wiley & Sons, New York.

Politics and Administration. By Frank J. Goodnow, A. M., LL.D. The Macmillan Company, New York. 12mo, 270 pp. Cloth, $1.50.

Fourteenth Annual Report of the Commissioner of Labor, 1899. Water, Gas and Electric Light Plants under Private and Municipal Ownership. Washington, D. C. 8vo, 983 pp. (A copy of this report can be had upon request to Hon. Carroll D. Wright, Washington, D. C.)

Houses for the Working Classes: How to Provide Them in Town and County. (Seven papers read at a national conference on the housing question at London.) P. S. King & Son, London. 12mo, 48 pp.

Corporations and Public Welfare. Addresses at the Fourth Annual Meeting of the American Academy of Political and Social Science, April 19-20, 1900. American Academy of Political and Social Science, Philadelphia. 8vo, 208 pp. Paper, $1. McClure, Phillips & Co., New York. 12mo. Cloth, $1.50.

The Coming Democracy. By Orlando J. Smith. The Brandur Co., New York. 12mo, 162 pp. Cloth, $1.

Water Works for Small Cities and Towns. By John Goodell. Engineering Record, New York. 8vo, 286 pp. Cloth, $2.

Municipal Improvements: A Manual for the Municipal Official. By W. F. Goohue. John Wiley & Sons, New York. 12mo, 207 pp. Cloth, $1.25.

The Purification of Sewage. By Sidney Barwise. Van Nostrand Co., New York. 12mo, 150 pp. Cloth.

The Separate System of Sewerage. By Cady Staley and George S. Pierson. Van Nostrand Co., New York. 8vo, 324 pp. Cloth, $3.

The Law of Electric Wires in Streets and Highways. By Edward Q. Keasbey. Callaghan & Co., Chicago. 8vo, 358 pp.

Municipal Public Works. By Ernest McCullough. 8vo, 153 pp. Paper, 50c.

PERIODICALS.

A Plea for New York. By J. K. Paulding. Atlantic Monthly, February.

Charities and Correction, New York State Conference of. Charities Review, December.

Public Swimming Baths. By Jane A. Stewart, Chautauquan, December.

Public Control of Private Corporations. By Richard T. Ely, Cosmopolitan, February.

Electric Central Stations in England. By Frank C. Perkins, Engineering Magazine, December.

Electric Traction on Italian Railways. By P. Lanino. Rassegna Nazionale, Florence, December.

Electricity at the Paris Exposition. By C. S. V. Brown, Cassier's Magazine, December.

Development of the Gas Engine. By R. S. Ball, Jr. Cassier's Magazine, December.

Model Public Library. By G. Iles. World's Work, December.

Problem of Municipal Government. By J. H. Batten. Arena, December.

Municipal Water Works Laboratories. By G. C. Whipple. Popular Science Monthly, December.

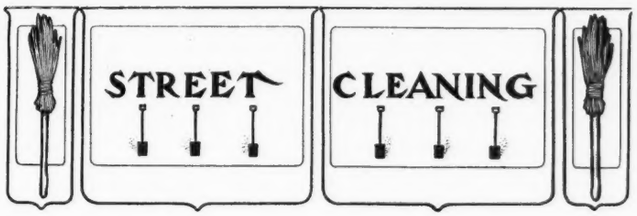
Music in Primary Schools. By C. I. Rice. Music, Chicago, December.

Making a Way Out of the Slum. By Jacob A. Riis. American Monthly Review of Reviews, December.

Tenement and Tuberculosis. By J. H. Pryor. Charities Review, December.

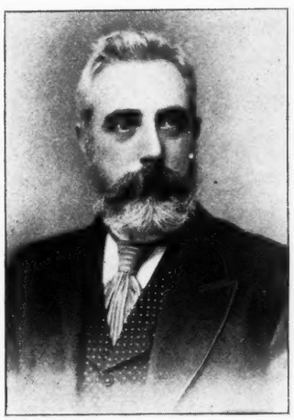
Gardens for Tenement Dwellers. By M. Loeb. Charities Review, December.

Municipal Affairs. Beginning with 1901, the subscription price of this interesting quarterly will be advanced to $2 per year. All orders received after January 1, 1901, must be at this rate, but one copy of the Bibliography will be sent, together with the three other numbers for 1901, for the subscription price—$2. Address, Municipal Affairs, 52 William street, New York City.



CLEANSING WORK IN SALFORD.

By W. H. Hamblett, Cleansing Superintendent of Salford, England.



W. H. Hamblett,
Salford, England.

Salford has a population of 221,000. The city has an area of 5,176 acres. The day and night cleansing work is centered in one department, and the carrying out of the work involves a total expenditure of £40,255—£15,686 for the day and £24,569 for the night.

The day cleansing is of the general and stereotyped order, and the 149 miles of streets receive the attention of the department by the application of the machine and hand brushes—somewhat more frequently than in the past, yet not so frequently as some of the ever watchful public would like.

The work varies according to the times and seasons of the year, but generally speaking, it may be taken as follows: Sweepers commence work at 4 A. M., and most of the principal thoroughfares are swept and the refuse collected by 9 A. M., or shortly afterwards.

The daily number of loads taken from a given district varies from four to fourteen, according to climatic conditions and the season of the year.

After bait time special attention is given to the cleansing of the less important streets, the removal of clinkers from the destructors, often to distant tips, and to street watering, and this work varies almost every day.

The only other work done by the day section is the clearing of the Cattle Market, and the removal of refuse from schools and some of the public buildings in the town.

There are thirty horses engaged in day work; 144 drivers, fillers and sweepers; thirty water barrels and tanks in use.

SNOW REMOVAL.

In the clearing of snow special arrangements have to be made, and the inspectors and men have rules for their guidance in the event of snow falling after the ordinary work of the day has ceased.

Seeing that the three depots of the corporation are far removed from each other, the department has in many portions of the town taken the liberty of trespassing upon the patience and kindness of owners of open spaces, by depositing large quantities of snow temporarily on their land which has been collected from the public streets.

In some towns it has been the common practice to utilize the manholes to the intercepting sewers or principal sewers of the town, and also to make free use of rivers for the carrying away of snow. Salford, however, has endeavored for some years past to get through the heavy work of these trying times without resorting to these practices.

If the fall of snow is at all heavy, snow ploughs, which have previously been got ready, are brought into operation, which effect a clearance of eight feet in width, and which are drawn by three or four horses, according to the depth of the snow.

The last great snow storm lasted nearly twenty-four hours, and snow fell to an estimated average depth of thirteen inches.

Whilst the snow was still falling the work of clearing the streets was commenced. The tram routes and other principal thoroughfares, to the number of seventy, were first dealt with and promptly cleared.

The length of these thoroughfares is thirty-two miles. Their area is 1,063,760 square yards, that is nearly one-half of the area of all the streets in the borough. The snow on these seventy thoroughfares measured 384,121 cubic yards, and is estimated to have weighed 83,340 tons. This bulk of snow would have filled 128,040 of the department's large carts, loaded to one foot above their sides.

It would have covered a street one mile long and twenty yards wide to a depth of nearly thirty feet.

After these seventy principal thoroughfares had been cleared, the remaining streets of the borough were taken in hand.

The estimated total weight of the snow that fell in the borough was 1,962,772 tons.

During the storm a total of 706 hired carts were used, and a total of 4,242 extra men employed, which, with our own men, amount to a grand total of 6,226 men having been engaged on the work of clearing the snow.

The cost of the storm to the department was about £1,150.

NIGHT DEPARTMENT.

In the night section of the Cleansing Department we have in Salford to deal with almost every form of storage of ashes and domestic refuse.

We have in use 13,612 barrels or bins, which gave a total number of emptyings for the year of 706,583. On the average each barrel was emptied fifty-two times during the year.

We have 8,889 pails in use. The total emptyings for the year amount to 499,594. Each pail was emptied on the average 56.2 times.

We have also 12,562 wet ashpits in use, which show a total emptying for the year of 135,276. Each ashpit was emptied on the average eleven times.

This work is carried out by the employment of fifty horses, fifty carters, fifty-three ashpit emptiers, and forty-eight pail, barrel and bin men.

The weights of refuse collected under the night and day systems are as follows: 42,874 tons from the ashpit system; 9,754 tons from the pail system; 32,213 tons from the barrel and bin system; 21,515 tons of street sweepings; 658 tons of cattle market manure. Giving a sum total of 107,014 tons collected, an increase of 2,527 tons on the previous year's collections. These figures show an average weekly collection of 2,058 tons, or 351 tons per working day during the year.

THE COLLECTION OF THIS REFUSE.

The department has to carry many of the loads collected a distance of three to four miles.

The Salford Corporation has no farm estate or dumping ground to which it may send large quantities of refuse without being treated in any way, or passed through the furnace of the destructor. For years past not a penny has been paid by the department for tipping ground.

The sales of nightsoil to farmers has become a far greater charge upon the finances of the department than the disposal of that portion of nightsoil which is given away.

The following figures will show how the same is disposed of: Nightsoil and excreta sold to farmers, 25,304 tons; cattle market and horse manure sold to farmers, 1,309 tons; street sweepings sold to farmers, 8,157 tons, or a total of 34,770 tons.

The manure sold to farmers in the country is despatched by rail and boat.

In addition to the refuse sold, the following quantities have been given away to farmers who called and loaded their carts at the depot: Nightsoil, 8,062 tons; street sweepings, 9,183 tons; or a total of 17,245 tons given away.

A bonus of 3d. is given to each farmer or laborer who takes away a load of manure.

The refuse passed through the destructors during the past year amounted to 49,508 tons, which, when burnt, was reduced to 17,998 tons of clinkers and ashes.

The clinkers are dispensed with by carting to tips, in many instances a long distance from our depots, carriage by boat to the country to farmers and others for road-making purposes, and to the depot of the Manchester Corporation for mortar making purposes.

Up to the present time the disposal of clinker residuals has been a positive charge on the department, and with the increased quantity of rubbish to be burnt, and the increased distances to which clinkers have to be carted, the expense has year by year become an increasing quantity.

The committee has, after considerable deliberation, determined upon: (1) The erection of new destructors with forced or accelerated draught; (2) the erection of mortar mills and the making of slabs, thus using up their clinkers, and hoping to give a commercial value to that which has for years past been an increasing cost to the department.

Vast as the cleansing work seems by the figures I have quoted, it is rendered most difficult to carry out, and absolutely impossible for the most devoted of officials to clear the town without receiving complaints in relation to the work.

It must be remembered that a great part of the work is carried out, and rightly so, during the night time, and as the work mentioned is scattered over two or three different parts of the borough, the discipline and oversight of a workshop is impossible, and much trust has to be placed in the men.

Great difficulties and discouragements are continually being placed in the way of the men in the carrying out of their work. Some people who often complain, say that they come too early, or too late, or empty too many barrels or ashpits at one point. The men make too much noise. Doors which should be left open are found closed.

One of the most astonishing features in connection with our department is the large quantity of broken glass and the number of bottles that are annually picked from the refuse at the destructors. During the past twelve months there were 208,020 mineral water bottles found; other bottles, 15,722, and ninety-seven tons of broken glass.

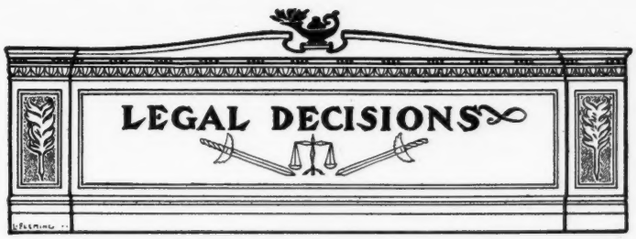
The furnace men pick out and store the bottles and glass. The mineral water bottles are returned to their owners through the Bottle Association, who pay our men 1d. per dozen for collecting them. The other bottles and broken glass are sold by the men, and the proceeds divided among them by their respective foremen.

PUBLIC SCHOOLS IN THE UNITED STATES.

Cities.	Land and buildings.	Apparatus, etc.	Total.
New York, N. Y.	$44,342,148	$2,079,618	$46,421,766
Chicago, Ill.	19,487,909	3,010,896	22,498,805
Philadelphia, Pa.	.....	.....	8,388,600
St. Louis, Mo.	6,781,506	131,605	6,913,111
Boston, Mass.	.....	.....	11,222,400
Baltimore, Md.	2,863,510	367,607	3,231,117
Cleveland, O.	4,350,789	278,119	4,628,908
Buffalo, N. Y.	2,983,405	479,494	3,462,899
San Francisco, Cal.	.....	.....	5,415,200
Cincinnati, O.	3,531,704	200,594	3,732,298
Pittsburg, Pa.	3,460,000	40,000	3,500,000
New Orleans, La.	900,000	100,000	1,000,000
Detroit, Mich.	.....	.....	2,875,385
Milwaukee, Wis.	.....	.....	3,204,760
Washington, D. C.	4,305,108	228,250	4,533,358
Newark, N. J.	.....	.....	2,262,875
Jersey City, N. J.	1,373,850	105,044	1,478,894
Louisville, Ky.	1,224,645	106,000	1,330,645
Minneapolis, Minn.	2,825,477	.....	*2,825,447
Providence, R. I.	2,622,156	50,000	2,672,156
Indianapolis, Ind.	2,300,000	93,355	2,393,335
Kansas City, Mo.	1,726,230	200,575	1,926,805
St. Paul, Minn.	2,426,400	117,550	2,543,950
Rochester, N. Y.	*1,465,000	160,000	*1,625,000
Denver, Col.	2,742,213	130,679	2,872,892
Toledo, O.	1,000,000	425,000	1,425,000
Allegheny, Pa.	2,122,919	17,500	2,140,419
Columbus, O.	2,207,549	149,796	2,357,345
Worcester, Mass.	2,114,519	374,568	2,489,177
Syracuse, N. Y.	1,306,100	106,178	1,412,278
New Haven, Conn.	1,500,517	99,000	1,599,517
Paterson, N. J.	700,000	65,000	765,000
Fall River, Mass.	1,690,650	61,800	1,752,450
St. Joseph, Mo.	580,210	52,345	632,555
Omaha, Neb.	1,609,165	85,000	1,694,165
Los Angeles, Cal.	1,130,031	75,624	1,205,655
Memphis, Tenn.	413,248	17,342	430,590
Scranton, Pa.	1,544,634	125,000	1,669,634
Lowell, Mass.	1,559,002	48,000	1,607,002
Albany, N. Y.	1,071,000	80,000	1,151,000
Cambridge, Mass.	1,588,900	141,135	1,730,035
Portland, Oregon	1,055,245	40,786	1,096,031
Atlanta, Ga.	680,000	65,000	745,000
Grand Rapids, Mich.	1,099,000	88,000	1,187,000
Dayton, O.	1,166,569	52,445	1,219,014
Richmond, Va.	442,500	25,750	468,250
Nashville, Tenn.	438,803	25,950	464,753
Seattle, Wash.	675,000	50,000	725,000
Hartford, Conn.	2,060,000	84,500	2,144,500
Reading, Pa.	826,300	77,500	903,800
Wilmington, Del.	596,837	78,668	675,505
Camden, N. J.	.....	.....	610,000
Trenton, N. J.	572,700	56,712	629,412
Bridgeport, Conn.	778,997	123,541	902,538
Lynn, Mass.	.....	.....	1,102,000
Oakland, Cal.	1,000,000	70,000	1,070,000
Lawrence, Mass.	.....	.....	603,128
New Bedford, Mass.	.....	.....	803,441
Des Moines, Ia.	927,200	37,515	964,715
Springfield, Mass.	1,647,382	125,694	1,773,076
Somerville, Mass.	1,061,753	51,189	1,112,942
Troy, N. Y.	435,000	20,500	455,500
Hoboken, N. J.	635,000	30,000	665,000
Evansville, Ind.	700,000	33,950	733,950
Manchester, N. H.	739,056	36,750	775,806

* Not including apparatus.

† Including lands and buildings for public libraries.



GENERAL AND SPECIAL CHARTERS.

THE Supreme Court of Wisconsin has decided that a city incorporated under a special charter cannot adopt a portion of the general charter law without adopting all of the provisions of the latter upon a subject. The city of La Crosse attempted to combine the provisions of both general and special charters in relation to street grades, paving, etc. The court held that adopting the special provisions selected from the general law made these in effect special legislation for that city, and hence unconstitutional.

* * *

RIGHT OF CLASSIFICATION.

IN a recent decision the Supreme Court of Pennsylvania said: "The Constitution does not prohibit the classification of cities, boroughs and townships. It does prohibit special legislation in regard to the same. As to the mode of classification, by the density instead of by the bulk of the population, we cannot see that it is liable to just criticism. In classifying cities which are great centers of a crowded population, the character of the city is sufficiently determined by the number of inhabitants, but in classifying townships, of which some are very large and some very small, it would seem to be the more reasonable."

* * *

CONTRIBUTORY NEGLIGENCE.

THE appellate division of the New York Supreme Court, Brooklyn, has recently affirmed a judgment giving heavy damages to a street railway passenger who was injured by jumping from a moving car as the result of fright upon discovering fire coming from under the motor box of the car.

* * *

LIABILITY FOR CONTRACTORS' ACTS.

THE New York Court of Appeals has unanimously upheld an affirmance of judgment by the Appellate Division in Brooklyn, holding that when a city lets a contract to competent independent contractors for the construction of a sewer, upon plans reasonably safe and proper, it is not liable for damages caused by the settling of the ground in front of private property on the line of the work from the negligent manner of its performance. Independence of control in employing workmen and in selecting the means of doing the work is stated to be the usual test for determining whether the contractor is independent or not. Merely reserving the right to the city as in this case, to change, inspect, and supervise the work, and to require the contractor to discharge incompetent men, is not sufficient, the Court says, to deprive him of the character of an independent contractor.

* * *

TAXATION OF FRANCHISES.

JUDGE HENRY, of the Circuit Court, at Kansas City, Mo., has handed down an opinion in a case of national importance recently, when he decided that the State of Missouri, represented by the State Board of Equalization, had no right to tax the franchise of the Western Union Telegraph Company. The Board practically doubled the company's valuation of its actual property, and added the words, "and on all other property, $862,000." It was this addition that the company contested.

* * *

LIABILTY FOR DEFECTIVE MAIN.

THE Supreme Court of Indiana held, in the recent case of The Tipton Light, Heat and Power Company *vs.* Newcomer, that where a complaint to recover damages on account of an explosion of natural gas, alleged to have escaped by reason of the defendants' gas main having become "defective, insufficient and out of repair," a motion to make the complaint more specific by stating in what way and manner such main was defective and insufficient, and where and in what manner it was out of repair, ought to have been sustained, and that where a bill of exceptions containing the evidence as presented to the judge failed to contain a map that had been introduced in evidence, but was lost, it was both the right and duty of the judge to supply a copy of such map if possible and insert it in the bill before signing and filing it even after the time allowed for presenting the bill had expired.

MUNICIPAL BOND SALES IN JANUARY

The opening of the new century shows encouraging activity in municipal bonds. The prices paid have materially increased, and cities have realized more on their securities than ever before. One reason for this is found in the plethora of money that is seeking investment. Investors are ready to accept much smaller rates of interest than formerly, provided the security is good. The only bonds that may be said to be better than municipal bonds are those of the Federal Government, and that is true largely because of the longer terms and not so much because of the beter security, although, of course, the government bonds are technically better.

The total sales of municipal bonds for the month of January aggregated $14,359,786. This is considerably above the monthly average for the past five years, and exceeds the monthly average during the phenomenal year of 1900, when the total sales aggregated nearly $175,000,000.

From present indications it is expected that this increase will continue through the remaining months of the year, and that at the close of 1901 the grand total of the year will be found to exceed that of 1900 by not less than $25,000,000.

The following table contains the majority of the sales which were made during the month of January, and gives the nature of the bond, the rate of interest, the term, the amount and the price paid. This table we expect to publish each month, and it will be found to be of considerable value to those cities which contemplate placing bonds on the market.

City and Bonds.	Rate.	Term, years.	Amount.	Price Paid.
Ann Arbor, Mich., Paving	4	10 Op.	$27,850	100.107
Adams Co., Ind., Township Road	4.5	1-2—20 S.	43,217	101.152
Ada Co., Ida., School	8	5	800	106.25
Archer Co., Tex., Court House	4	20 Op.	24,000	Par.
Athens, N. Y., U. F. School No. 2	3.5	6 2-3 Avg.	11,500	101.05
Buffalo, N. Y., City	3	1	19,932	Par.
Buffalo, N. Y., Tax Loan	3	5	189,730	Par.
Bridgeport, Pa., Borough	4	15 3-4 Av.	37,000	104.25
Bronson and Bethel, Mich., School	5	1—9 S.	9,000	105.56 2-3
Buffalo, N. Y., Grade Crossing	3.5	20	49,700	107.012
Cincinnati, O., Improvement	3.5	10—20 Op.	150,000	104.38
Carnegie, Pa., Tax-exempt	4.5	26 2-3 Av.	30,000	116.476
Charlevoix, Mich., Bridge	4.5	20	20,000	110.0
Cascade Co., Mont., Refunding	3.5	20	100,000	Par.
Dansville, Ky., Sewer	4	1—17 S.	25,000	101.812
Dawson Co., Mont., Refunding	5	10—20 Op.	11,000	106.50
Evanston, O., Telford Ave. Assessment	5	1—10 S.	14,684	105.005
Evanston, O., Assessment	5	1—10 S.	8,845	105.37
East Washington, Pa	4	5—30	20,000	102.0
Fort Collins, Col., Water, Gold	4	10—24 Op.	105,000	Par.
Gloversville, N. Y., Improvement	4.5	3 1-3 Av.	14,000	102.75
Gloversville, N. Y., Voting Machine	4	2 3-4 Av.	4,500	101.70
Gloucester, Mass., Muncipal	4	1—10 S.	21,000	104.262
Hutchinson, Kas., Refunding	5	20—30 Op.	25,000	106.55
Hagerstown, Md., Electric Light	4	23—39 S.	17,000	106.05
Hamilton, N. Y., Village	3.5	5 1-2 Av.	3,800	100.131
Hamilton, N. Y., Village	3.5	5 1-2	3,800	100.131
Jacksonville, Ore., Funding	5	1—5 S.	1,000	102.0
Jacksonville, Ore.	5	6—13 S.	4,000	103.75
Kingston, N. Y., Refunding	4	1—15 S.	1,500	104.55
Kingfisher, Okla., W. and E. Lgt	4	10—20	26,000	Par.
Lewis Co., Wash., School	5.5	5—10 Op.	1,000	100.10
Los Angeles, Cal., School	6	1—10 S.	5,000	109.10
Montgomery Co., Ala., Road	4.5	40	100,000	111.0
Newport, Ky., Refunding	3.65	30	562,000	104.737
Niagara Falls, N. Y., Paving	5	1—9 S.	45,000	100.033
Olive, N. Y., Bridge	4	4 1-2 Av.	14,000	104.003
Oceanside, Cal., Improvement	6	1—40 S.	5,000	103.10
Oregon City, Ore., Sewer	6	10	12,500	107.75
Owossa, Mich., Refnding	4	20	10,000	Par.
Pontiac, Mich., Paving	5	1—4 S.	22,000	Par.
South Dakota, Emergency	4	1 1-3 Av.	250,000	100.044
Syracuse, N. Y., Water	3.5	1—20 S.	100,000	103.745
Shandaken, N. Y., Refunding	4	1—10 S.	5,000	104.450
Shandaken, N. Y., State Road Imp	4	1—9 S.	4,500	104.022
St. Joseph Co., Ind., Bridge	4	11 2-3 Av.	50,000	108.40
Springfield, O., Sewer	6	1—5 S.	6,430	106.16
Springfield, O., Sewer	6	1—5 S.	2,006	106.17
Springfield, O., Sewer	6	1—5 S.	1,240	105.68
St. Charles, Mo., Water Works, Gold	4	10 1—6 Op.-Av.	115,000	102.047
Two Harbors, Minn., Water & Lgt Imp.	5	10	5,500	103.93
Ulster, N. Y., Refunding	4	1—7 S.	28,000	103.085
Woodstock, N. Y., Refunding	4	1—10 S.	1,000	103.25
Waterford, N. Y., Paving	3.5	4 1-2—16 1-2 S.	13,000	102.007
Wawarsing, N. Y., Bridge	5	1 Av.	4,900	101.594
Youngstown, O., Sidewalk	5	3-4—4 3-4 S.	5,000	103.34

PUBLISHERS DEPARTMENT

NEW ORLEANS HAS NEW FIRE ALARM.

THE city of New Orleans, La., was one of the very first cities of the United States to adopt the Gamewell system of fire alarm telegraph, and it has been in service there for over thirty years. But recently it was decided important to secure quite extensive additions to the service, and in doing so to take advantage of the many improvements which have been made since the introduction of the system, and which have added largely to its reliability and efficiency.

Under contract with the Gamewell Company, of New York, the city has just received an almost entirely new plant, and it has been thoroughly tested and accepted. A unique feature of the contract was that there should be no interruption in the alarm service while the new work was going on.

The contract was for about $75,000, and New Orleans is now to be congratulated on having as good and perfect, if not a little better plant, than any other city, not only in the United States, but in the world, for it is well known that nothing can be found abroad that will compare with the fire alarm systems furnished by the Gamewell Company.

THIS COMPANY HAS ITS HANDS FULL.

T. C. PERKINS & Co., of Hartford, Conn., engineers and experts in the designing, construction and management of gas, electric lighting and street railway properties, report a considerable amount of work on hand. Some of the most important of which are a municipal electric lighting plant for the village of Ilion, N. Y.; extensive changes and enlargements of the plant of the Mystic Electric and Gas Light Company, of Mystic, Conn.; the preparation of plans and specifications for the new plant of the Essex Light and Power Company, of Essex, Conn.; the Warren and Brookfield Electric Light Company, of Warren, Mass.; a municipal electric lighting plant for the city of Waterbury, Conn., and also for the city of Stamford, Conn.; complete plans and specifications for twenty-five miles of electric railway, for the Davenport and Springfield Street Railway Company, and a forty-mile road for the Hartford and Worcester Street Railway Company, both of which are to be built during the coming season.

DUMPING WITHOUT STOPPING.

A VERY unique wagon for the use of cities and general contractors is made by the Watson Wagon Company, of Canastota, N. Y. This wagon holds from one to seven cubic yards of material. It can be dumped without stopping the team and the same lever brings the bottom into place for another load.

The practical value of this wagon is thoroughly demonstrated by the following letter, addressed to the Watson Wagon Company, Canastota, N. Y.:

"Cleveland, Ohio, July 25, 1900. Gentlemen: Please find enclosed check in payment of the wagon which you shipped to us two months ago.

"I wish to say that your wagon has been in constant use, working alongside of wagons of other makes, and not a screw or bolt has been loose about your wagon, and we have not spent one cent in repair work on it. Our other wagons have cost us on an average of $5 per month to keep in repair, and your wagon has shown that it can handle five loads while any of the other wagons are handling three. Our foreman says that he would rather handle two Watson wagons than five of any other make, and that the service rendered will bear him out in that statement.

"We have twelve Springfield wagons and have been renting ten others from W. H. Ford & Co., of this city. Mr. Ford needs his wagons on the first of the month, and we have decided to purchase nine Watson wagons immediately. Mr. Ford has been watching the work of your wagon, and he tells me to-day that he is going to order six at once. Please ship us nine before you fill his order, if you are short in your supply, as we are compelled to push our work. It is quite possible that we may need six or seven more next month. Yours truly, The General Construction Co., Crosby Thompson. Treasurer and Manager.

THE VOTING MACHINE IN NEW YORK STATE.

THE United States Standard Voting Machine Company had 442 voting machines in actual use in the recent national election, in twenty-five cities and towns in the State of New York, as follows:

Buffalo	108 machines.	Batavia	7 machines.
Rochester	73 "	Hornellsville	6 "
Syracuse	60 "	Royalton	6 "
Elmira	28 "	Johnstown	6 "
Utica	28 "	Albion	5 "
Auburn	15 "	Ridgeway	5 "
Poughkeepsie	14 "	Hudson	5 "
Oswego	12 "	Le Roy	4 "
Jamestown	12 "	Shelby	4 "
Niagara Falls	10 "	Pittsford	2 "
Gloversville	10 "	Canisteo	2 "
Ithaca	10 "	Winfield	1 "
Rome	9 "		
		Total	442

According to the testimonials of the city officials, in the cities and towns where the machines were used, the machines gave unqualified satisfaction. Machine voting has come to stay, in these municipalities, at least.

TRADE NOTES.

—The city of Richmond, Va., has just installed 250 incandescent Boulevard lamps from the Boulevard Globe and Lamp Company, New York, and the city claims that it is getting the best system it has ever had. It contemplates equipping the entire city with 800 more in the near future.

—Mr. George C. Hutchings, who for a number of years was with the Fire Extinguisher Manufacturing Company, of Chicago, has opened offices in the Hall Building, corner of Ninth and Walnut streets, Kansas City, Mo., and has taken the agency for the Seagrave apparatus for that city and the surrounding territory.

—The city of Binghamton, N. Y., will use the Bardswell Votometer in the aldermanic election to be held some time this month. The Bardwell Votometer Company has a bill before the Legislature of Connecticut which provides for the elimination of the defects in the election law, and at the same time adapting it to the use of the voting machine.

—The Hammond Typewriter has recently perfected its manifolding quality to such an extent that it now claims its ability to turn off as many good carbon copies as any machine in the market. There is no machine made that gives more satisfactory results in the first copy. Full particulars, together with sample of the work performed can be obtained by addressing the Hammond Typewriter Company, 167 Broadway, New York city. The Hammond is particularly well adapted to city work.

—Charles A. Brown, superintendent of streets of Cambridge, Mass., in referring to the Shadbolt wagon, made by the Shadbolt Manufacturing Company, Brooklyn, N. Y., which had been used in his department for the past year, said: "The old sixteen one-horse carts, holding a little more than a yard and a half each, have been superseded by nine large two-horse dump wagons, each with a capacity of nearly six yards. As the number of trips to the dumps is greatly decreased on account of the increased capacity of these new carts, the same amount of ashes, etc., can be collected and disposed of much more economically than under the old system."